RAILROAD GAZETTE

FRIDAY, JULY 26, 1878.

Brake Experiments.

Some very remarkable experiments have recently been made on the London, Brighton & South Coast Railway by Captain Douglas Galton and Mr. George Westinghouse with an apparatus designed by the latter. These experiments and the apparatus used have been described at great length in the English engineering papers, and they have formed the subject of a paper by Captain Galton which was read at the recent meeting of the Institution of Mechanical Engineers at Paris.

The object of these experiments was, so far as can be known from the reports before us, to determine:

First, the amount of the friction or the resistance between the brake-blocks and the wheels of a railroad car and between the wheels and the rails under various conditicns and at different times.

Second, The conditions which secure a maximum stopping power are, as stated by *Engineering*: "The three chief points regarding which information is being sought are: First, the effects of various pressures on the brake-blocks in producing skidding at different speeds and with different conditions of rails, etc.; second, the amount of retarding force measured by the pull or thrust upon the brake-blocks due to their hold on the wheels under different conditions; and, third, the actual amount of retardation due to the action of the brake as measured by the strain on the drawbar of the braked vehicle. The observations also include the accurate recording of the speed of the vehicle during the application of the brakes as well as other matters to which we shall refer hereafter."

To determine these points a four-wheeled brake van—resembling one of our four-wheeled freight "caboose cars"—was fitted up by Mr. Stroudley, the Locomotive Superintendent of the line referred to. Two brake-blocks were applied to each wheel, as shown in fig. 1. These were suspended by two links, *g* and *g'*, attached to the ends of a lever, *h*, above. It is evident from fig. 1 that if the wheel is revolving in the direction indicated by the darts the friction of the left-hand brake-block will cause a downward pull on the link *g* just equal to the friction of the block on the wheel, and the friction of the right-hand block will produce an upward thrust on *g'* also equal to the friction. Both of these forces will act on the lever *h*. In order to be able to measure them, the latter, at three-eighths of its whole length from the centre, is connected by a link, *n*, with the piston of a hydraulic cylinder, *i*.

As this hydraulic cylinder is an important feature in the arrangement, its construction will be described here. It consists of a cylindrical box, *A A*, which is covered by an india-rubber disc, *d d*, which is fastened to the box by a ring, *b b*, secured by suitable bolts. The piston consists of a cast-iron plate or ring, *e e*, which fits loosely in the ring, *b b*, and has a cavity in the centre in which the rounded end of the rod *R* rests. The india-rubber disc is fastened to the piston by a brass ring, *r r*, screwed on the boss which forms the cavity *R*. The piston slides easily in the ring with but little friction, and is made water-tight by the india-rubber disc under it. Thus we have a perfectly water-tight piston, which will move with very little friction; and as its movement is very small, the disturbing effect of the india-rubber at its edge may be regulated; thus the pressure exerted on the piston will be communicated to the water underneath, which is measured by a Richards indicator, which is connected with the cylinder by a pipe screwed into the aperture, *f*; the motion to the paper drum of this indicator being given by a water clock, which also drives the other indicators, to which we shall refer presently. The water clock, which is conveniently arranged on the floor of the van under a table which carries the indicators and their driving gear, consists simply of a plunger working freely in a hydraulic cylinder, this plunger being weighted, and the water being allowed to escape from beneath it through a very fine aperture. The rate of descent can, of course, be modified at will by altering the size of the hole of escape, or by varying the weights, and it can thus be adjusted to that found most suitable for the experiments. To the plunger of the "clock" is connected a cord which passes over a pulley fixed on a light horizontal shaft suitably mounted, this shaft carrying other pulleys from which cords are led to give motion to the paper drums of other Richards indicators, which will be referred to hereafter.

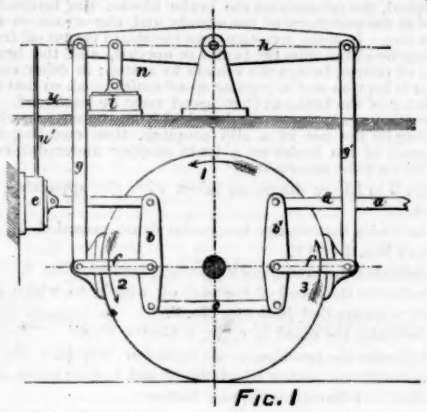


FIG. 1

To insure that the cylinder under the diaphragm shall always be full of water, there is provided within the van a loaded pump plunger, or practically an accumulator, connected with the aperture *g* of the hydraulic cylinder by a small copper pipe, not shown in fig. 2. The action of the piston and cylinder is described by Captain Galton in his paper as follows:

"Suppose the whole apparatus to be filled with water, and that a force were applied to the piston by the rod, it would force some of the water out of the vessel, through the opening, into the indicator cylinder; the area of the indicator piston is half a square inch, and its maximum range 0.8 of an inch, therefore the quantity of water required to make a maximum movement of the pencil is 0.4 cubic inches, and as the area of the piston is 30 square inches, its movement would only be 0.013 in., or $\frac{1}{75}$ in.; which is such a small movement that the india-rubber will introduce no appreciable error. Now, if the indicator piston did not leak, and if it were possible to keep exactly the right quantity of water in the apparatus, nothing more would be required to make it work properly, but, as this is evidently impossible, the supply valve *v* becomes necessary. A small pipe leading from an accumulator, loaded to a greater pressure than can ever arise in the vessel, is screwed into the socket *g*; the excess of pressure on the outer side tends to close the valve; there is also a spring which forces the valve on to its seat. This valve is seated with india-rubber, and is made perfectly water-tight. The spindle [of the valve] passes up to *r*, so as very nearly to touch the brass collar on the underside of the piston. Suppose the whole apparatus to be filled with water when there is no force acting on the piston; then, if a force is applied, this will move the piston downward so as to send some water into the indicator, and raise the pencil, and will also open the valve, and, as the pressure in the accumulator is in excess of that in the vessel, the water will enter, and go on entering till the piston is raised and no longer opens the valve. Now, if the force on the piston be removed, the indicator spring will force a quantity of water less than 0.4 cubic inches back into the vessel, and raise the piston less than $\frac{1}{75}$ in., and thus the piston can only move $\frac{1}{75}$ in. above the position in which it touched the valve. Again, if we suppose a smaller force to be applied to the piston, it will not be pressed down so far, and will not open the valve, unless sufficient leakage has meantime taken place to allow the piston to come down through its full distance; thus the valve always keeps the right quantity of water in the apparatus to make it work properly, by occasionally opening and letting in enough water to make up for leakage."

FIG. 2

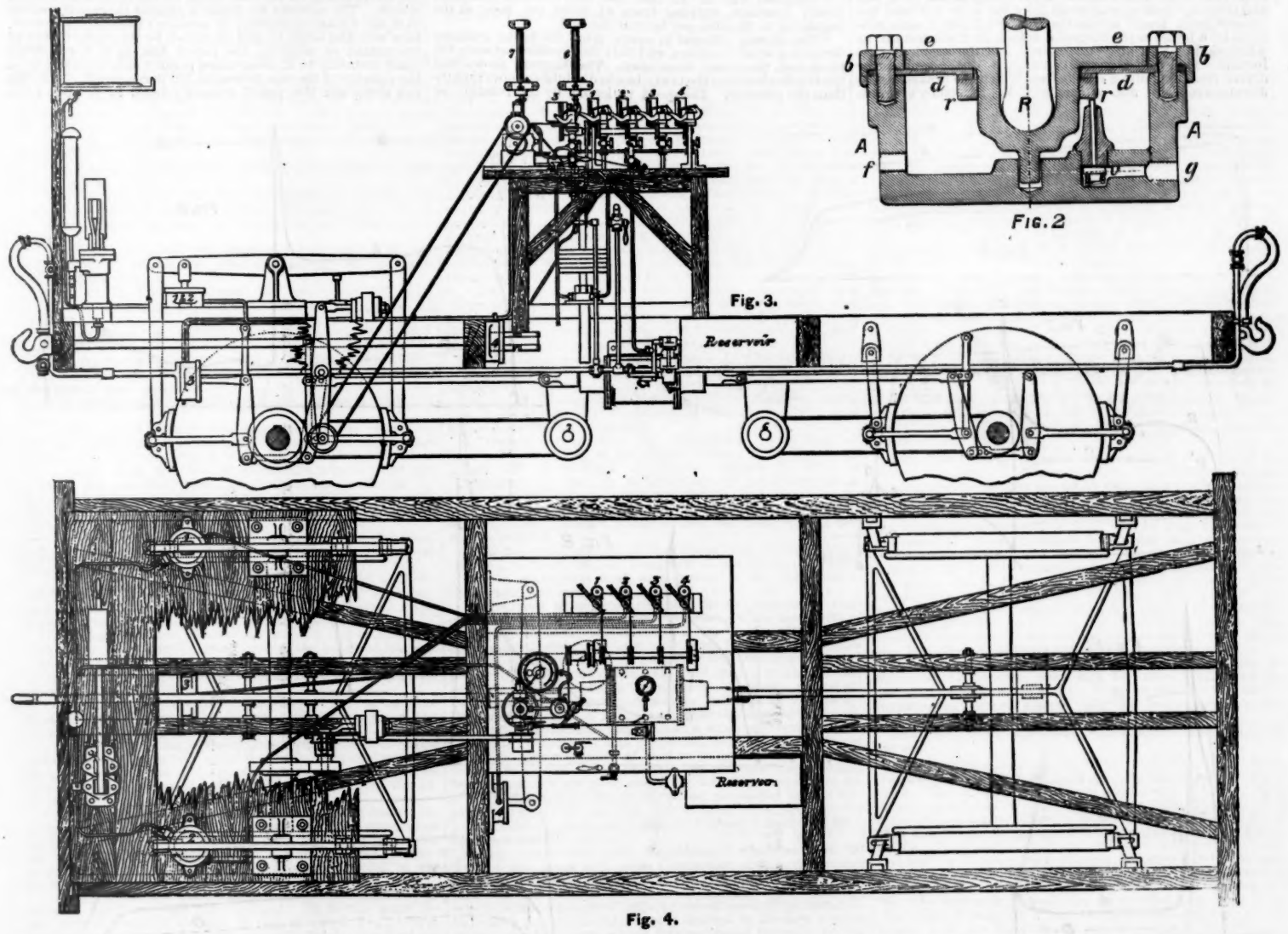


Fig. 3.

Fig. 4.

Referring again to the diagram, fig. 1, it is evident that with the arrangement described it will be possible to measure the friction of the brake-blocks, or what has been called the "*tangential strain*," by the diagram made by the Richards indicator at any given period of time.

"In the diagram *a* is the push-rod connected to the piston of the Westinghouse brake apparatus, this rod transmitting the pressure from the piston to the brake rigging. The push-rod *a* is coupled to the upper end of a lever *b'*, this

lever being one of a pair, *b b'*, standing vertically on opposite sides of the axle, and having their lower ends connected by a link, *c*. From the upper end of the lever *b* another push-rod, *d*, goes off to the plunger of another hydraulic cylinder, *e*. The corresponding blocks on opposite sides of the vehicle are connected by light trussed bars, and these bars are coupled at the middle of their length to the levers *b b'* by the links *f f'*. In this way it will be seen that any strain applied through the push-rod *a* is equally distributed to the four blocks with which the pair of wheels is fitted, while a strain equal to that on the push-rod *a* is transmitted to the push-rod *d* and through it to the plunger of the hydraulic cylinder *e*." To the latter a Richards indicator is also connected, so that the pressure in the brake-blocks can always be measured simultaneously with their tangential strain.

The apparatus employed is further described in *The Engineer*, from which our engravings are copied, as follows:

"In a similar way the strain on the draw-bar is measured by connecting its end to the centre of a beam having a fixed fulcrum at one end while its other end rests on the plunger of a hydraulic cylinder of the same construction as those already described. In this way half the strain on the draw-bar is imposed upon the hydraulic plunger. The hydraulic cylinder for the draw-bar is like the others provided with its Richards indicator. There is thus one indicator for measuring the pressure on the brake blocks, two for measuring the tangential force acting at the periphery of the wheels, and a fourth for measuring the pull on the draw-bar.

"Besides actuating the paper drums of the four Richards indicators already mentioned, the water clock also drives that of Mr. Westinghouse's speed indicator, described by us some time ago. This indicator is driven by means of a belt and friction wheel arrangement from the axle to which the experimental brake apparatus is applied, and it thus indicates by a break in the diagram drawn by it the instant at which skidding—if any—takes place, and the speed at that instant. The van likewise contains a distance-measurer driven from the pair of wheels from which the brakes can be disconnected, and also a couple of Mr. Stroudley's simple speed indicators, one driven from each axle. A gauge is also fitted for showing the pressure of air available for working the brakes, and means are of course provided for applying or releasing the brakes at pleasure."

[Figs. 3 and 4 represent a longitudinal plan and section of the whole apparatus.]

"The mode of conducting the trials is as follows: The van being attached to an engine and the speed at which it is desired to make an experiment having been attained, the brake is applied and the water clock started simultaneously, and the pencils of the various indicators being all in contact with their papers, diagrams are simultaneously taken recording the speed, the pressure on the brake blocks, the tangential force at the periphery of the wheels, and the strain on the draw-bar. In some investigations the steam is shut off from the engine at the time the brake is applied, and the brake then, of course, brings the vehicle to a stop; in other cases steam is kept on and a regular speed maintained, so that the behavior of the brake at that speed may be analyzed. In other cases again the van is detached from the engine when running by the use of a slip coupling, thus enabling the efficiency of the brake as a train stopper under different conditions to be ascertained."

Figs. 5 to 13 are diagrams taken with the apparatus, in which

A indicates the average tangential strain recorded by indicators Nos. 1 and 2.

B indicates the brake-block pressure, indicator No. 3.

C indicates the speed of the pair of wheels to which the brakes were applied, indicator No. 6.

C' indicates the speed of train, indicator No. 6.

D indicates the traction on the draw-bar, indicator No. 4.

The conditions under which figs. 5 and 6 were taken are described as follows, by Captain Galton:

"Diagram Fig. 5. In this case the velocity remained nearly constant, varying from 41 miles per hour at the beginning to 40 miles per hour at the end.

"The air was allowed to escape from the brake cylinder through a small aperture, and thus the pressure between the block and the wheel diminished. The diagram shows that the friction between the brake-blocks diminished more rapidly than the pressure. The speed indicated by the rotation of the wheels to which the brakes were applied was the same as that of the wheels running free.

"Fig. 6. This diagram was taken when the van was moving at a speed of 25 miles an hour. The application of the brake slackened the speed to 20 miles an hour in 10 seconds, when the wheel skidded, and the experiment terminated in 22 seconds, when the speed had been reduced to 17 miles an hour.

"In this case the diagram shows no diminution in the rotation of the axle until the skidding took place.

"The velocity of the train was reduced in the 10 seconds which elapsed from the time when the brakes were fully on till the wheels skidded, from 25 to 20 miles an hour; whereas in the period of 11 seconds which elapsed between the skidding of the wheels and the cessation of the experiment the velocity was only reduced from 20 miles to 17 miles per hour.

"Fig. 7. In this experiment the velocity was 21 miles an hour when the brakes were applied to the wheels; the speed was reduced by the action of the brakes to 18 miles, when the wheels immediately skidded.

"The diagram shows that the co-efficient of friction between the brake-blocks and the wheels gradually increased as the speed diminished until the skidding point was reached, and that the tractive force exerted on the draw-bar was suddenly greatly diminished after the skidding took place."

In commenting upon these experiments *The Engineer* says:

"In the first place, then, it appears that the effect of a skidding-wheel as a train-stopper is beyond comparison less than that of a wheel allowed to revolve while pressed on by the brakes." [To illustrate the above *The Engineer* uses an ideal diagram which we have not reproduced, but refer instead to one of the actual diagrams taken, fig. 7, in which *A* represents the curve of tangential strain, and *D* the traction in the dynamometer or draw-bar.] "Here 11 is the zero-line drawn by the pencil of indicator No. 1 let us say, showing the forces acting on the scale-beam for the right-hand leading wheels. The moment the brake is applied the pencil gets up to 2, the wheels continuing to revolve; presently, however, they stop and begin to skid [as shown by the curve *C*] and at the instant of stopping the pencil flies up to 3, and drops again instantly to 4, from which point it only rises slowly as the velocity of the van decreases, till it reaches 5. Here the van stops, and the pencil instantly drops to 6. But 4 is a

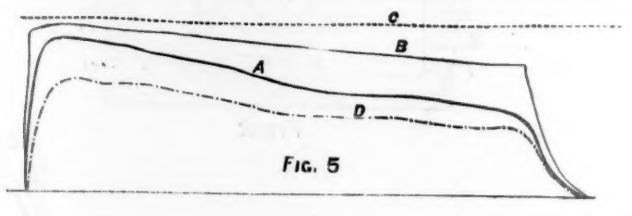


FIG. 5

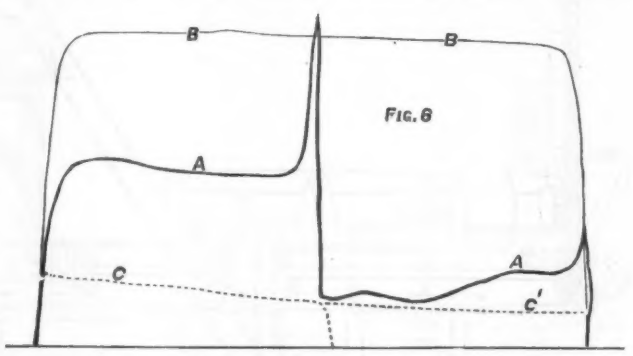
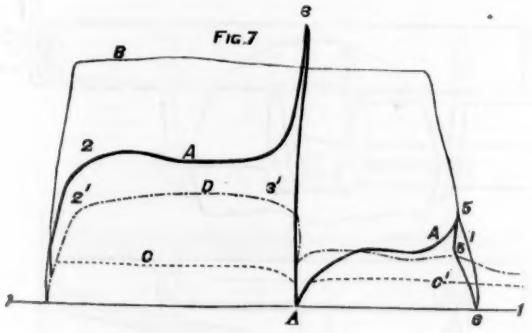
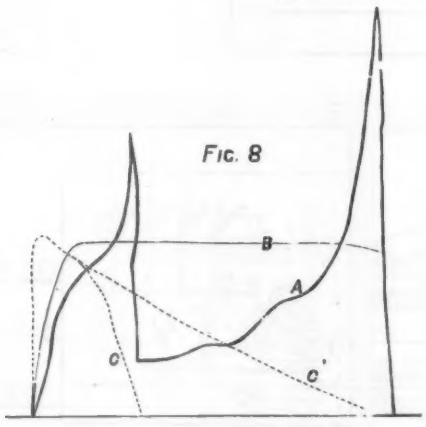
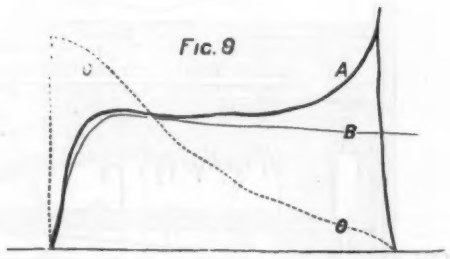
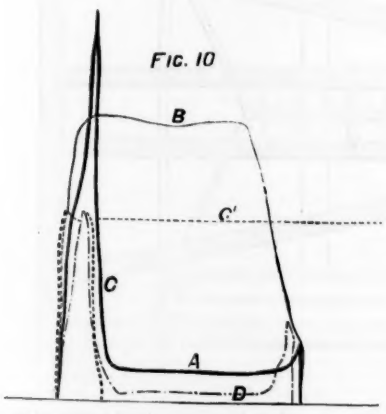


FIG. 6









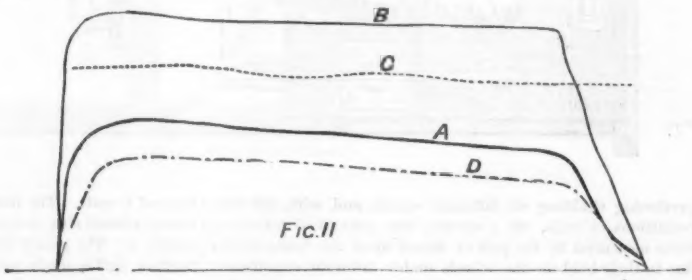
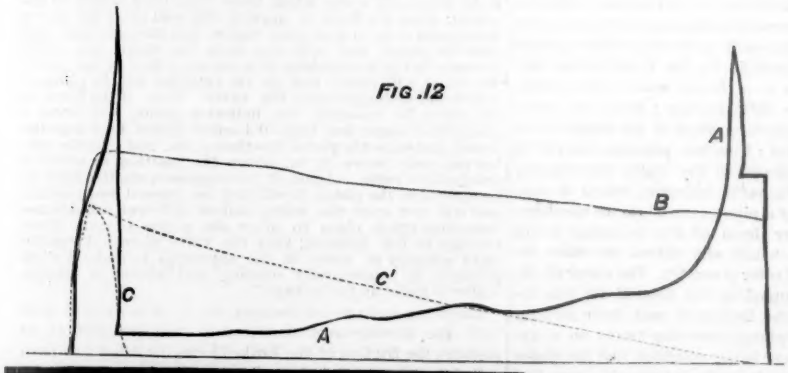
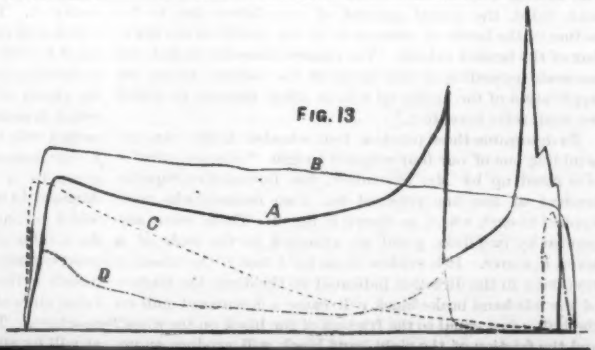
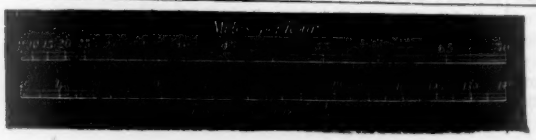
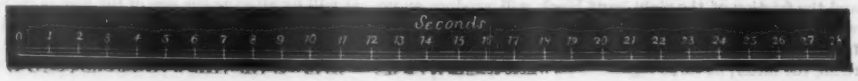


FIG. 11









point of no effect, and it seems that at the instant of skidding the friction between the rail and wheel is so small that the wheel is not solicited to revolve. By degrees, however, from some cause yet to be explained, the friction apparently increases, and the pencil rises as shown. If the evidence stopped here, there would be some reason to doubt its accuracy; but we have strong corroborative testimony in the diagram *D* given by the dynamometer. * * * As the strain increased the pencil rose fast to 2′, thence to 3′ it is steady, at 3′ the wheels skidded suddenly, and the resistance of the carriage at once falls to 4, and thence rises slowly to 5′, when the brakes were taken off, and thence it falls to 6. If this is not corroborative testimony, nothing deserves the name."

The other diagrams are described as follows by Captain Galton:

"Fig 8. In this case the brake van was detached from the engine by means of a slip coupling, when traveling at a speed of 40 miles an hour.

"The pressure of air in the brake cylinder, and consequently the pressure on the brake blocks, remained nearly constant during the experiment.

"The pressure being greater than that required by the co-efficient of friction between the brake-blocks and wheels, due to the velocity, the friction increased so rapidly as to cause the wheels to skid immediately.

"After the skidding, the friction at once decreased rapidly, but rose again as the speed diminished, and attained its maximum when the train came to rest, which occurred with many jerks in 12½ seconds.

"Fig. 9. Slip. In this case also the brake van was detached from the engine by means of a slip coupling, when traveling at a speed of 46 miles per hour.

"The pressure of the air in the brake-cylinder was less than in the preceding case; and it was gradually diminished during the experiment. Consequently the force with which the blocks pressed on the wheels diminished to the same extent during the experiment.

"At first the friction between the brake-blocks and wheels also diminished slightly, but when the velocity of the van decreased, the friction between the brake blocks and the wheels increased rapidly. The van came to rest in 12 seconds, without any jerk, before this pressure had risen to a point sufficiently high to produce skidding.

"These two diagrams afford a comparison of a stop with skidding and one without skidding.

"The latter stop was effected with a uniform motion without jerks, from a speed of 46 miles an hour in 12 seconds, when the former required 12⅓ seconds to stop from a speed of 40 miles an hour, with a series of unpleasant jerks.

"Fig. 10. In this experiment the velocity was uniform at 44½ miles an hour.

"The pressure applied to the brake-blocks sufficed to skid the wheels at once.

"The diagram shows that the co-efficient of friction between the brake-blocks and the wheels decreased immediately after the skidding, and only rose at the end of the experiment.

"The tractive force on the draw-bar increased with the act of skidding, but largely decreased as soon as the skidding was effected.

"Fig. 11. In this experiment the speed was 45 miles an hour at the beginning, which decreased to 42½ miles at the end.

"The pressure was slightly decreased during the experiment.

"The pressure applied to the wheels did not suffice to skid them, and the wheels with brakes and those without brakes revolved at the same rate.

"The tractive force on the draw-bar follows a uniform line.

"A comparison between this diagram and the preceding one shows that although the line of pressure on the brake-blocks in the former cases, in which the wheels were skidded, was greater than in this case where the wheels were not skidded, the practical effect of the brakes as shown by the tractive force on the draw-bar was much greater with the wheels braked, but not skidded, than with the skidded wheels.

"Fig. 12. In this experiment the van and the engine were brought to rest by means of the brake from a speed of 40 miles per hour.

"The wheels skidded rapidly after the brake was applied; the retarding force rose greatly at the moment of skidding, and then fell considerably below the original amount. The wheels remained skidded to the end of the experiment.

"The diagram shows an increase in the co-efficient of friction measured by the pressure between the brake-blocks and wheels, as the velocity diminished; this increase was slight at first, but more rapid as the velocity became reduced, and very great at the moment of stopping.

"Fig. 13. In this experiment the van and the engine were brought to rest from 39 miles an hour by means of the brakes.

"The compressed air in the cylinder was allowed to escape through a small aperture, after the brake was applied; and thus its pressure, and consequently the force with which the blocks pressed against the wheels, diminished during the experiment.

"The diagram shows that the retarding force due to the pressure of the brake-blocks on the wheels at first diminished until the reduction of velocity reached the point where the increase in the coefficient of friction was sufficient to overcome the effect of the diminished pressure applied to the brake-blocks.

"At this point the retarding effect of the brakes was increased, and the wheels were skidded. Up to this point the two pair of wheels of the van, to one of which brakes were applied while the others were running freely, revolved approximately at the same rate, as shown by Mr. Stroudley's speed indicators.

"At the moment of skidding the curve rose in a nearly vertical line, thus showing that the co-efficient of friction became very great as the wheel came to rest; and the time during which the wheel was partly rotating and partly slipping was almost inappreciable.

"Immediately after the rise the curve fell to a point far below its original position, thus showing a great diminution in the retarding effect of the brakes.

"After this point the curve rose again, while the velocity continued to decrease, and thus showed that the co-efficient of friction between the rails and the wheels when skidded increased as the velocity diminished.

"At the moment when the van came to rest the coefficient of friction became very great.

"It is unnecessary in this preliminary paper to give the particulars of the reduction of the diagrams; but the principal results shown by them may be summed up as follows:

"1. The application of brakes to wheels, when skidding is not produced, does not appear to retard the rapidity of rotation of the wheels.

"2. When the rotation of the wheels falls below that due to the speed at which the train is moving, skidding appears to follow immediately.

"3. The resistance which results from the application of brakes without skidding is greater than that caused by skidded wheels.

"4. During the moment of skidding the retarding force increases to an amount much beyond that which prevailed before the skidding took place; but immediately after the act of skidding is complete, this pressure falls down again to much below what it was before the skidding.

"5. The pressure required to skid the wheels is much higher than that required to hold them, skidded; and appears to bear a relation to the weight on the wheels themselves, as well as to their adhesion and velocity.

"It would seem that the great increase in the frictional resistance of the blocks on the wheels just before and at the moment of skidding, due to the increase in the co-efficient of friction when the relative motion of the blocks and the wheel becomes small, is what destroys the rotating momentum of the wheel so quickly.

"With constant pressures, the friction between the blocks and the wheels, and consequently the retarding force, increases as the velocity decreases.

"In order to obtain the maximum retarding power on the train, the wheels ought never to skid; but the pressure of the brake-blocks on the wheels ought just to stop short of the skidding point. In order that this may be the case, the pressure between the blocks and the wheels ought to be very great when the brakes are first applied, and gradually to diminish until the train comes to rest.

"There are other points of interest, indicated in the diagrams, which require further elucidation; among which may be mentioned the question whether the co-efficient of friction diminishes when the pressure increases, and the velocity remains constant.

"Another question is as to the practical effect on the wheels themselves resulting from the greater amount of work done by retarding the wheels without skidding, as compared with the effect of skidding.

"The general conclusion which would appear to follow from the results of the preliminary experiments is that none of the hand brakes and only some of the continuous brakes now in use have been designed with a clear knowledge of the most essential conditions required in a perfect brake."

The above experiments are well worth careful study, and with these still in progress, will supply us with a new revelation of knowledge on this important subject.

The Narrow-Gauge Convention.

According to announcement, this convention of the advocates of narrow-gauge railroads assembled in Cincinnati, July 17. The only departure from the proposed plan was that instead of meeting in the Opera House the meeting was held at the "Lookout House." To those not acquainted with the geography or topography of Cincinnati it should be said in explanation that it is located on a nearly level plain surrounded by high hills. In hot weather the sun blazes down on this plain, which is occupied by the city, and the hills in a great measure exclude the breeze, if there is any. For this reason the astute manufacturers and vendors of beer have erected large halls on top of the hills, which are reached by inclined railroads operated by wire ropes. To these hills and halls the sweltering and thirsty Cincinnatian is wont to resort to inhale the breezes and imbibe his favorite beverage. Connected with the beer hall there is usually a concert room in which music and beer are both dispensed. In one of these rooms of the Lookout House the convention was held. The following report of the meetings is made up partly from those in the Cincinnati papers, which were very full, and partly from notes taken at the meetings:

The convention was called to order by Col. E. Hulbert, of Bedford, Ind., who read the circular issued by the Central Executive Committee, which we have heretofore published.

Col. S. N. Yeoman, of Washington Court House, Ohio, was made temporary Chairman of the Convention, and Major John Byrne, Secretary.

A Committee of five on Credentials, consisting of Messrs. W. H. Allen, of the Miami Valley; D. D. Parry, of Illinois; B. J. Gifford, of Illinois; James F. Ely, of Washington C. H.; S. A. Hutchins, of the Columbus & Northwestern Railroad, was appointed. A Committee on Permanent Organization, consisting of Col. E. Hulbert, F. F. Hayne, J. W. Graham, John B. Lee, and Geo. Wilbur was then appointed.

After the appointment of the Committee on Credentials the Hon. S. F. Covington, President of the Cincinnati Board of Trade, was introduced, and welcomed the delegates to Cincinnati, and said:

"Cincinnati is largely interested in the objects of your meeting. Notwithstanding she is situated upon the banks of one of the finest navigable rivers in the world, with navigable waters connecting and extending for many thousands of miles in every direction, and affording the most extended means of transportation, she has built the old-style railroads in every direction, and in her municipal capacity, as you all know, has already provided sixteen millions of dollars for the construction of a single road, that she may have the advantages of railroad connection in a single direction. More than this: Cincinnati has projected, and has in rapid progress, six hundred miles of narrow-gauge railways concentrating at a point not more than one thousand feet distant from where you are now, and from which she expects to derive great benefits. She is, therefore, interested in the subject for which you are met; she expects to be benefited by your meeting; she expects to be instructed in matters affecting her material interests."

Major Byrne then made an address of welcome upon behalf of the Local and Joint Committee and local railway interests, thanking the convention for the handsome compliment in the presence of so many during such weather, which, with hundreds of letters from all parts of the country, indicated a marked and growing interest in the new system of rail transportation, which, having passed through all the diseases incident to infantile life, had become a full-grown youth and was now, in the persons of its representatives in convention assembled, demanding recognition from the commercial and industrial interests of the country. He alluded to the prejudices and obstacles the system had to contend with until by force of merit and the unflinching effort of its friend, and advocates, such as the distinguished Chairman and the National Secretary, it had secured a position unassailable, and stood forth to-day the recognized friend of commerce and the solution of the vexed question of cheap transportation. It alone furnishes a maximum facility at a minimum cost. He regretted the hot weather which had, according to hundreds of letters received by the morning mail, kept many away.

Colonel Hulbert then moved, that as the Committee on Credentials had some difficulty in making a report, each member who desired to do so should consider himself a delegate. The motion was carried.

The Committee on Credentials afterwards reported the following delegates present:

J. O. Arnold, Dayton, Covington & Toledo; David Allen, Miami Valley; S. J. Bivans, President Cincinnati & Fayetteville; H. G. Brooks, Brooks' Locomotive Works, Dunkirk; G. S. Baker, Toledo & Southwestern; E. O. Briggs, Toledo & South Haven; S. Brownell, Marietta & Shawnee; H. E. Bullock, Treasurer Havana, Rantoul & Eastern; Maj. John Byrne, Engineer Cincinnati & Eastern; James Clark, Cincinnati & Fayetteville; J. G. Clemens, Miami Valley & Columbus; Judge John R. Craven, Madison, Ind.; Thomas Corcoran, Marietta & Shawnee; William Campbell, Liberty, Ind.; S. L. Campbell, Petersburg & Worthington; W. A. Drennan, West & East Mississippi; A. M. Dukes, Wabash & Erie; E. Davis, Clinton, Ill.; J. P. Duckwald, Cincinnati & Eastern; E. M. Drain, Frankfort, Ky.; Jas. F. Ely, Columbus, Washington & Cincinnati; D. K. Este, Superintendent of the Cincinnati & Portsmouth; H. S. Espey, Cincinnati, Jeffersonville & Ohio River; M. C. Elliston, Dayton & Southeastern; R. Evans, Miami Valley; H. R. Fullerton, Parker & Karns City; W. F. Friedley, Madison, Ind.; S. A. Forbes, Ashland, Ky.; C. Fellows, Dayton & Southeastern; A. R. Forsyth, Greensburg, Ind.; Geo. H. Frey, Springfield, Jackson & Pomeroy; A. P. Gatch, Miami Valley & Columbus; J. M. Graham, Danville, Olney & Ohio River; B. J. Gifford, Havana, Rantoul & Eastern; H. M. Gastrell, Vandalia & Western; Captain J. Gore, Cincinnati & Fayetteville; J. E. Gimperling, Dayton & Southeastern; W. W. Graves, Columbus & Mineral Valley; M. F. Hall, Cincinnati, Jeffersonville & Ohio River; D. K. Harvey, Cincinnati & Fayetteville; H. P. Hepburn, Tampa, Pease Creek & St. John's River; J. A. Hutchinson, Columbus & Northwestern; Col. E. Hulbert, Secretary National Central Executive Committee, Bedford, Ind.; A. J. Hodder, Bedford, Springfield, Owensboro & Bloomfield Railway; L. C. Hopkins, Cincinnati; D. A. Hopkins, New York; Allen Hyler, Indianapolis, Delphi & Chicago; S. S. Haines, President Miami Valley Railway; Dr. J. W. Haines, Miami Valley Railway; A. C. Hays, Pittsburgh Southern; V. Holt, Indianapolis, Delphi & Chicago; B. B. Harris, I. C. & L., Greensburg, Ind.; Albert F. Hill, New York; John F. Hager, Charteroy Railway Company, Kentucky; M. Hegler, Indianapolis, Delphi & Chicago; J. Shling, Toledo & Southwestern; S. Jones, Miami Valley; George Ingersoll, Coldwater, Marshall & Mackinaw; W. C. Ireland, Charteroy; J. G. Isham, Portsmouth & Cincinnati; W. L. Jamison, Columbus & Northwestern; A. H. Johnston, Arkansas Central; J. H. Jones, Rising Sun; T. M. Jackson, Weston & West Fork; B. S. Jones, Bedford, Springville, Owensboro & Bloomfield; M. Jamison, Cincinnati & Eastern; J. Q. Justice, Bedford, Springville, Owensboro & Bloomfield; Wm. Kip, Parker & Karns City; E. Kent, Clinton, Ill.; F. W. Kellogg, Marietta & Shawnee; C. B. Knowlton, Wabash & Erie; John Lee, Indianapolis, Delphi & Chicago; H. C. Lowrie, Indianapolis; D. M. Loudon, Georgetown, O.; W. C. Mabley, Parker & Karns City; T. A. Mellon, Ligonier Valley, J. H. Miller, Pittsburgh Southern; E. Martin, P. P. & T.; W. W. Miller, C., J. & O. R.; Hy. Morrison, Frankfort & State Line; Dr. J. G. McPheeters, Monroe, Ind.; H. L. Meek, Springfield, Jackson & Pomeroy; W. L. Morgan, Miami Valley & Columbus; John Merchant, C., W. & C.; F. M. Moore, Ripley, Wilmington & Dayton; Dr. S. McClintock, C., W. & C.; John Vairn, Marietta & Shawnee; Gen. Negley, Pittsburgh, New Castle & Lake Erie; B. E. Orr, Springfield, Troy & Northwestern; F. J. Pickard, Columbus & Maysville; H. Phillips, Dayton & Southeastern; Capt. J. D. Pierce, Virginia; J. and G. D. Penfield, Havana, Rantoul & Eastern; F. Parker, Parker & Karns City; W. C. Pendleton, Wheeling; J. V. Patton, Emlenton, Shippenville & Clarion; D. D. Parry, Burlington, Monmouth & Illinois River; D. Peters, Cincinnati & Hamilton; Wm. Roudebush, S. J. Rybolt, Cincinnati & Fayetteville; W. L. Kankins, Paris, Ky.; Jos. Ramsey, Bell's Gap; A. J. Robertson, Springfield, St. Paris & Sidney; John H. Sullivan, Bedford, Brownstown & Madison; G. B. Smith, Dayton, Covington & Toledo; John Scott, B., B. & M.; E. Saxton, New York; Origin Thompson, Greensburg, Ind.; E. L. Thomas, B., S. O. & B.; T. F. Wards, Atlantic City; R. B. Williams, Bellefontaine; Dr. Williams, Rising Sun; W. C. Winstandley, B., S. O. & B.; Wm. Ward, C. & E.; A. W. Wright, H., R. & E.; G. H. Wilbur, C. & E.; A. W. Waters, Cincinnati & Hamilton; Samuel Woodward, C. & E.; Otway Walson, Columbus; C. Wulsin, R., W. & D.; Col. S. N. Yeoman, Danville, Olney & Ohio River.

Hon. Josiah Kirby delivered an address of welcome on behalf of the Board of Transportation. The object of the convention was to consider the great importance of the advantages of the narrow-gauge system. There were over four thousand miles constructed and in course of completion, and the enterprise was receiving more energy than any other in the country. It was a mistake to suppose that the narrow-gauge was opposed to the standard. The standard gauge had done a work all of us should be proud of, and now the narrow-gauge was to be brought in as an auxiliary, and not competitive, and thus assist in the grand development. We need these new enterprises to keep our country of 40,000,000 of people at work, for work is the great thing at last. The labor of the country calls for the serious attention of every one, and prosperous labor shows a prosperous country.

The panic stopped the standard gauge work, and the demands of the country were still for more roads, and the narrow gauge filled the want. We must reinvest in labor by investing in narrow gauges, and the two systems of construction must always be adjuncts to each other.

Hon. Benj. Butterworth then welcomed the delegates again. He said:

"My brother Kirby has suggested something which is important, namely, that the laboring interests should be looked after. The inventive genius of this country has brought about a great deal of enforced idleness. Other fields of labor must be found, new interests be developed. Some have said that the inventive genius should be stifled; but that must not be. Men have been given inventive faculties to be used. But how is this enforced idleness to be avoided? The man who invents a machine that will do the work of five men, is in danger of throwing that number out of employment, and the only way such a result can be avoided is by opening up new fields of industry. This is what you are met here to-day to do. You are opening the way for men to find work, in the construction of these new lines of road, and when done, they will enable the consumer to buy what he needs at a lower figure, and let some of the population of our overcrowded cities get out into the country and acquire homes for themselves.

"I do not believe that there is any necessary conflict between the narrow and standard systems of railroads, but if there is, let the fittest survive—let the one which produces the greatest amount of good to the greatest number have the field, if but one of the systems is to live. The construction of the two systems is bound to produce that healthful competition which works for the good of all. The standard gauge I believe to be destined to be used for the long pulls, and the strong pulls, and the narrow gauge will do very important auxiliary service."

President Lee of the Indianapolis, Delhi & Chicago Railroad then spoke. He was glad to meet so many friends of the system. It would do more to develop the mighty resources of this country than all other interests combined. The system will do great good. For many years he had been at the head of corporations which have built many miles of standard-gauge roads in his State. But in his opinion the narrow-gauge system would solve the problem of cheap transportation. He was President of several projected roads which he was satisfied must be made of narrow-gauge. A large majority of the standard-gauge roads at the West had failed. Any narrow-gauge railroad built through a fertile country, if well constructed and managed, would pay the country and the builders. He hoped that information of

the system would be disseminated through the country, so that the whole country would be aroused.

He stated that there are 3,000 miles of narrow-gauge road in running order, 4,000 under contract, and 10,000 in organization, and that before ten years there would be 20,000 miles of narrow-gauge road in the United States. Mr. Lee has built one thirtieth of the roads built in Indiana, and was, until lately, standard guage. He believes that the narrow gauge is what the country needs, as a help to the other.

AFTERNOON SESSION.

The Committee on Permanent Organization reported as follows:

For Chairman, Colonel S. N. Yeoman; Secretary, Major John Byrne; Vice-Presidents, Colonel L. M. Dayton and Adolph Wood, of the Cincinnati Chamber of Commerce; E. V. Cherry, Board of Trade; Hon. Josiah Kirby, Board of Transportation; Hon. L. C. Hopkins, local roads; T. Woodward, President of the Cincinnati & Eastern; W. C. Mostanley, Vice-President of B., S. O. & R. R.; B. F. Gifford, Hanover, Rantoul & Eastern; W. A. Drennan, President of W. & C. Railway, Mississippi; Vine Holt, Indianapolis, Delhi & Chicago; W. C. Mobley, Parker & Karns City Railroad.

The following were appointed a Committee on Order of Business: E. Hulbert, L. C. Hopkins, John Carlisle and Francis W. Kellogg.

Mr. Kellogg of Alliance, Ohio, replied on the part of the convention to the addresses of welcome which had been delivered during the morning session. He returned thanks to the local committee and our citizens generally for the warm and hearty reception which had been extended to the delegates of the convention. He then spoke appreciatively of the enterprises in which Cincinnati is engaged. The effort to open up direct trade with Mexico and South America, and the building of the Southern Railroad were alluded to. The speaker then went on to say that more miles of narrow-gauge railroad were built in Ohio the past year than in any other State. These roads are reaching the vast wealth which is stored up in the interior of the state. The coal fields are being penetrated by them. It is coal that has made England what it is, and Ohio contains coal enough to supply England for a thousand years. It will one day make her industries wonderfully active and progressive, and in bringing this about the narrow-gauge lines are destined to play an important part.

Colonel Hulbert then reported the following committees: On Resolutions—Benj. J. Gifford, Havana, Rantoul & Eastern; Albert H. Hill, New York; Thomas Corcoran, Marietta & Shawnee; John Lee, Indianapolis, Delhi & Chicago; S. B. Smith, Still Water Valley Railroad.

On Construction—S. Woodward, Cincinnati & Eastern; J. M. Graham, Danville, Olney & Ohio River; J. Gore, Cincinnati & Fayetteville.

On Rolling Stock—E. Hurlbert, General Superintendent B., S. O. & R. R.; J. W. Sprague, Ohio Falls Car Company; Geo. S. Billmeyer, of Billmeyer & Small, York, Pa.; H. G. Brooks, Brooks Locomotive Works, Dunkirk, N. Y.; Kirt Porter, of Porter, Bell & Co., Pittsburgh.

On Operating Expenses.—A. W. Wright, Superintendent Havana, Rantoul & Eastern; W. W. Borst, Superintendent Denver & Rio Grande; Geo. H. Wilbur, Superintendent Cincinnati & Eastern.

It was stated that the committees, except the one on resolutions, are not expected to report for some time to come. All that the present convention can do will be to discuss the different gauges in a general way. The several committees will give the matters to which they are assigned careful study, and report at a future convention. It is proposed that their reports shall then be placed in permanent form.

Mr. Hayes, of the Pittsburgh Southern Railroad, objected to the adoption of the committee's report, and moved its reconsideration. He was the oldest narrow-gauge man in the house. He objected to having persons from the Brooks Locomotive Works or Porter, Bell & Co. on their committees. He wanted men who were engaged in the practical operation of narrow-gauge roads. He objected to the statement that the broad-gauge were the roads of the country and the narrow-gauge were auxiliaries. The time would soon come when the latter would be the main lines. Narrow-gauge roads cost only three-fifths as much as broad-gauge roads. If this is so, how can they be auxiliaries? The roads represented should furnish a map so that they could show what roads were needed. He said that one road was built with $80,000 bonded indebtedness; what is the difference between it and a broad-gauge line? There was no affinity between the broad-gauge and the narrow-gauge. It had been demonstrated that the capacity of any narrow-gauge line is equal to all the demands that may be made on it. He found that it was quite possible to carry on his 3 ft. gauge road all the passengers that the Pennsylvania Railroad carried to the Centennial. Every company should make a careful estimate of the resources of the country through which its line is built, and then it will be possible to tell whether the road will pay or not. When the traffic is not in the country you can't get it. The first question is to determine whether there is business enough to support the road or make it pay. Build your road without any bonded indebtedness. The road he was connected with had built its line without any. They raised money by going to the people and asking them how much they wanted the road. They took the notes of the farmers payable in transportation. The result was that the farmers all patronized the road. They went into Washington, Pa., and they got from $15,000 to $16,000. In this way the bondholders cannot "scoop-up" the road. He was opposed to allowing the men who make cars or locomotives to be on their committees. He had operated locomotives practically, and thought that a man may be able to drive a jackass and yet not be able to make one. What he would do would be to get a committee which would give a full account of the cost and operating expenses. The complexion of these committees will determine whether he would become identified with these conventions. What he wanted was information, and if he could not get it there better than he could at home, he would stay at home. What he wanted was a compilation of the actual facts of the operation of roads. He considered that a man not connected with the narrow-gauge road should not compile statistics.

Mr. Hopkins said he did not know any of the firms whose members were appointed on the committee; but it was necessary that the people of the United States should have the information that was needed, and if the committee was to follow the advice of the gentleman who spoke, they would appoint him on all the committees because he knew it all. Out of 18 names three were connected with manufacturing companies, and they were the people who should know.

Mr. Woodward was on the Committee on Construction, and no one was more competent to give advice than he. He named the members of the committees, and pointed out that all of them were gentlemen of experience in narrow-gauge construction. Mr. Brooks, Mr. Sprague and Messrs. Billmeyer and Small were all able men.

Another *speaker* did not think when he came that it was a mutual admiration society, and if the convention was to be run by manufacturers and supply dealers he wanted to be counted out. If the supply dealers came in, it would ruin the movement. If the superintendents and those who were engaged in operating the roads could not tell how to run a road, it would be time to call on others.

Another member moved that the report be referred back to the committee and it instructed to strike out the names of all who are not directly connected with narrow-gauge roads.

Mr. Carlyle said he was responsible for two of the manufacturers in the committees. They should know better than any one else how to build cars and locomotives.

Mr. Gifford wanted some men both inside and outside of railroads. Mr. Brooks had been building and studying narrow-gauge locomotives, and must it therefore be said, he does not know anything about them? If he wanted to learn anything about a locomotive or cars he would go to a builder. He did not believe in persons getting up and recommending that they should not incur bonds when he admitted that he was under obligations to the subscribers for their money. He was in favor of putting a standard-gauge man on the committee, if there was such a one present.

Mr. Hurlbert said that the gentlemen on the committees gave their names and support years ago when the narrow-gauge was in its infancy.

Mr. Jameson said that Mr. Hayes intimated that the committee was organized in the interest of the manufacturers. He was responsible for several of their names, and those selected were put there because it was thought that they would give the most complete report.

Mr. Hays renewed his objections to the supply men, although he said Messrs. Porter, Bell & Co. were his personal friends.

After some further remarks by members of the convention, a motion was made providing for the reconstruction of the committees, all supply men to be omitted. This motion, after a lengthy debate, was withdrawn, and a motion made that the lists of names proposed for the various committees be acted on separately. The debate drew out some personal remarks, but the harmony of the convention was not seriously interrupted. The disposition to bounce the manufacturers or "supply" men was at length overcome, and the following added to the committees: On Construction—A. C. Hays, of the Pittsburgh Southern; H. M. Gastral, of Natchez, Miss.; S. S. Haynes and J. K. Cravens. To the Committee on Machinery and Rolling Stock, Mr. A. H. Johnson was added.

The following was offered by Mr. L. C. Hopkins, and adopted unanimously:

"*Whereas*, Colonel Hurlbert, of Indiana, has had large experience in narrow-gauge railroad matters, and has made the system a study for years, therefore be it

"*Resolved*, That Colonel Hurlbert be and is hereby invited to address this convention, at its opening hour on Thursday morning, on the comparative merits of the two systems."

The time of the address was afterward changed to 8 o'clock in the evening.

It was also voted that at the next session each of the delegates be invited to give his experience in the construction and operation of narrow-gauge railroads, and that five minutes be allowed to each member.

Another member then proposed that a map be procured, so that each delegate could show thereon the location of the line of his road.

SECOND DAY'S SESSION.

The convention assembled at 10 o'clock. The chairman called on the vice-presidents to take seats on the platform, but only one or two were present.

Colonel Hurlbert offered the following resolution, which was adopted without dissent.

"*Resolved*, That in view of the necessity of concert of action, and dissemination of information in the construction of narrow-gauge roads, a National Central Executive Committee be appointed, consisting of thirteen persons, to whom all applications may be made for information, and all statistics be forwarded, said committee to have full authority to call the narrow-gauge advocates into convention at such time and place as they may think proper, and to take such action as they may deem advisable to advance the general interests of the narrow-gauge syetem."

Colonel Hurlbert said that what was needed was something of the nature of a hand-book, which could be placed in the hands of all desiring information concerning the narrow-gauge system.

A committee of three consisting of General Negley, Colonel Hurlbert and Major Byrne, was appointed to select this committee of thirteen. Later in the day the following were reported as members of the committee:

Colonel E. Hurlbert, Bedford, Ind.; General Jas. S. Negley, Pennsylvania; H. M. Gastral, Mississippi; J. M. Graham, Illinois; Major John Byrne, Cincinnati; B. E. Wells, Dalton, Ga.; Captain John Scott, Brownstown, Ind.; A. F. Hill, Pittsburgh; G. M. Priest, Ky.; Colonel S. N. Yeoman, Washington C. H., Ohio; D. E. Small, York, Pa.; B. F. Bartlett, Ohio; W. O. Rockwood, Maryland.

Mr. John H. Sullivan, of Madison, Ind., then offered the following resolution, which was, on motion of Mr. Carlisle, laid on the table:

"*Whereas*, The Congress of the United States, in 1876, granted a charter for a narrow-gauge railroad from Washington City to Cincinnati, thence west to St. Louis and Chicago; and

"*Whereas*, There is that portion of the line from Cincinnati to Bedford, Ind., and to Indianapolis, which has not been located; therefore be it

"*Resolved*, That the President of this convention appoint a committee, to be composed of the delegates on the lines designated to this convention, with instructions to report as soon as practicable, defining the lines as nearly as can be."

The resolution was laid on the table.

As the Committee on Resolutions was not ready to report, the Chairman answered that miscellaneous business was in order. Some one asked whether there was not to be an address. Another person inquired whether an experience meeting was not in order. Major Byrne stated that the address of Colonel Hurlbert would be postponed until the evening.

Mr. Ramsey, of the Bell's Gap Railroad, said that the day before had been spent in the transaction of preliminary business, and he hoped the regular business would be taken up, which was to get information concerning the working of narrow-gauge roads. The convention then resolved itself into an experience meeting. The Secretary was requested to call the roll of members, but it could not be found. Mr. Haye was called for, but he was not present.

A member present inquired "What is the best weight of iron for a road through an agricultural district?"

There was no response, excepting that some one said that would depend upon circumstances. Colonel Yeomans was then called for, and said that narrow-gauge railroads, if properly built, would command the confidence of capital, which at present they were without. Many lines were projected without sufficient capital and would fail. Roads at present were being built by local aid, and they were undergoing a severe test. If saddled with expensive salaries for their operation, the entire system would be swamped and discarded. The convention should organize a bureau or syndicate to properly present the securities of such roads to capital. It was the most important question for this country. The narrow gauge has against it the standard-gauge system. The latter is now passing into the power of a few men, who believe that the narrow-gauge system is against their interests. Therefore the narrow gauge must be organized into transcontinental or through lines. It would then command the influence which it deserves. It is impossible to operate the standard-gauge roads and pay interest on their original cost. Their cost now for Western roads is $16,000 per mile The people have constructed these roads and are entitled to cheap transportation. The narrow gauge costs $8,000, and it costs less to operate, but high salaries could not be paid. He had built 57 miles of narrow-gauge road as cheaply as possible. Its bonds have no value, because the narrow-gauge has not the confidence of the people.

A member asked what the road cost per mile.

Mr. Yeomans said he undertook to build it for $3,000 per mile.

A member asked what it actually cost.

Mr. Yeomans said he did not feel called upon to say. The contract price was $7,000 per mile.

It then appeared that $3,000 per mile had been raised in cash to construct the line, which, and an issue of bonds of $4,000 per mile, had been received by the contractors for building the road.

Major Byrne, of the Cincinnati & Eastern, in response to an inquiry from Mr. Bullock, of Illinois, said he believed that the weight of rail depended to some extent upon the grade and curvature of the road. On his road they used a 40-lb. rail, with ties six feet in length, six inches face, and six in thickness. Some of those used were sawed and others hewn. The hewed he regarded preferable. The ties cost from 25 to 27 cents. Where the traffic is of a heavy character, such as coal, iron, stone, etc., and the curvature sixteen degrees, a 40-lb. rail is preferable; if lighter, a light rail is preferable. They used a rail composed partly of old and partly of new iron. They used 16½ tons locomotives, which pull 12 cars of eight tons each up a 70-foot grade. Box cars weigh 4¼ tons each. The longest grade is of three continuous miles. He believed the equipment of narrow gauges disproportionately heavy. The great point is to reduce dead weight, and increase carrying capacity. His road was built on the usual plan of aid from the people along the line. The road cost $10,000 per mile, $5,000 from the people in stock and $5,000 in bonds, there being a mortgage of $500,000 on the first 100 miles of the road; $10,000 per mile was the full cost of the road, including everything. It had a bonded debt of $5,000 per mile, and these bonds had been taken by their own stockholders, principally at 80 cents. They labored under many disadvantages of connection and transfer of freight, and they paid $2,000 per month for the use of the standard-gauge road in entering the city. They were moving two trains per day. He believed the narrow gauge furnished the maximum of facility, and the minimum of cost, but he feared the system would be weakened by trying to make the roads too cheap. Make good roads and they will do the work. Build up their credit, and make them stand as reliable with capitalists as the best.

Mr. Ramsey, Engineer and Superintendent of the Bell's Gap Railroad, spoke next. He said his road was constructed in 1872, and has been in successful operation since that period. It branches off from the Pennsylvania Railroad at Belleville, a point seven miles east of Altoona. It is built through a very mountainous country, and of necessity the grades are very heavy and the curves very sharp, the maximum grade being 3 ft. per 100, or 158.4 ft. per mile. This grade is persistent for a distance of seven miles, the total elevation reached being 1,234 ft. above the Pennsylvania Railroad at the junction, and 2,297 above tide water at Philadelphia. As a comparison between the narrow-gauge and broad-gauge, in cost of transportation, the following figures are given, compiled from six years' actual operation. The freight being loaded from the narrow-gauge cars into the cars of the Pennsylvania Railroad, and the weights given are the actual weights of the cars of the respective roads.

The coal cars of the narrow-gauge railroad weigh 2,200 lbs., and carry an average of 7,500 lbs. each, and have been in constant use since the opening of the road, and have averaged equal to a mileage of over 30,000 miles each car, and are still in good order. The engines weigh 16½ tons in working order, and make four trips per day. They are able to take a train of 32 cars up the grade, and the day's work consists of 128 cars, carrying 480 tons of coal. These 480 tons of coal are transferred into 34 cars of the Pennsylvania Railroad. The comparison made is based on the supposition that these 34 broad-gauge are to be hauled up to the mines for their coal, instead of hauling narrow-gauge cars to the broad-gauge railroad, the same motive power being required in both cases. The 134 narrow-gauge cars weigh 140 tons, and carry 480 tons. Now the total tonnage over the road, including weight of engines, is 960 tons.

The cost is: Train-men, $9.20; coal, oil, waste and repairs of engines (4.3 cents per train mile in 1877), $3.09; cost of transfer to broad-gauge cars, $3.00; total cost of transportation (narrow-gauge cars), $15.29. To take up the 34 broad-gauge cars they have 300 tons weight of cars to haul, requiring $2\frac{3}{18}$ days' work of the same engine and trainmen. This gives us the following figures: Train-men, $20.24; mileage, coal, oil, and repairs, $7.23; total cost, $27.47. The total tonnage passing over the road in each case would be as follows: Narrow-gauge cars, 960 tons; broad-gauge cars, 1,630 tons; an increase of 70 per cent. over the narrow-gauge cars. This increase in gross tonnage causes a corresponding increase in the repairs of track. The average per day during 1877 was $13; increasing this 70 per cent. we have a cost of $22.10.

Taking the above figures we have as a result these figures: Cost of transportation of 480 tons of coal, narrow gauge, $28.29; broad-gauge, $49.50; saving of the narrow-gauge over the broad-gauge, $21.25 per day, equivalent to $6,500 per year—over 6 per cent. interest on $102,000, the cost of construction of the Bell's Gap Railroad.

These figures plainly showed that even had it been possible to construct a broad-gauge road for the same amount, the saving in the operation (in the items of train service and track repairs above) is equal to 6 per cent. interest on the amount invested; or, while the broad-gauge road would be operated without any profit, the narrow-gauge would earn 6 per cent. on the investment.

THE RESOLUTIONS.

Mr. Gifford, of the Committee on Resolutions, then presented the following report:

"WHEREAS, The question of transportation has grown to such magnitude in this country that it demands the serious attention and earnest efforts of every economist to examine and ascertain the cheapest and most desirable method of conveying the products and the merchandise of the country to the various marts of the world; therefore, be it

"*Resolved*, That on account of the cheaper cost of construction, lighter operating expenses and smaller interest account, the narrow or three-foot gauge is the factor that will finally solve the problem, and bring the country that which it so much needs—cheap transportation.

"*Resolved*, That the practical working of the narrow-gauge railways of America during the past six years has demonstrated beyond a reasonable doubt the feasibility of the gauge of three feet, proving, as it has, the following facts:

"1. That a good road may be constructed at a cost and equipped on this gauge not in excess of two-thirds, all things being equal, of the sum necessary te construct the standard

gauge. 2. That when constructed it can be operated for a sum less than two-thirds of the sum necessary to operate the standard gauge doing the same amount of business. 3. That its capacity is ample to meet all requirements. 4. That it is equally as safe as the standard gauge. 5. That the capital invested therein has proved more remunerative than like investments made in standard-gauge roads under similar conditions. 6. That when built they have given satisfaction to their patrons equal to that of the standard gauge.

"*Resolved*, That the real advantages of the narrow-gauge roads cannot be fully compared with the standard-gauge roads until they can be able to reach, by extensions or connections, general distributing depots, until which time their advantages cannot be fully realized by the public.

"*Resolved*, That the narrow-gauge road should no longer be looked upon as an auxiliary road, merely because it is constructed on the three-foot gauge.

"*Resolved*, That a narrow-gauge road may be built at the present prices of labor or material from the Mississippi or Missouri River to the seaboard, capitalizing upon the bases of actual cost, and profitably compete with the water routes for the transportation of freight.

"*Resolved*, That inasmuch as very few of the narrow-gauge railways of America have an indebtedness exceeding one-half their actual cost, and that many are projected when the companies have already secured available stock subscriptions equal to such proportion of the estimated cost, we invite the attention of capitalists to the bonds of these roads as a matter of investment, and to carefully consider the security offered, the liability of the companies, and their ability as an earning power, and that they carefully contrast the same with the standard-gauge roads now in operation.

"*Resolved*, That inasmuch as serious mistakes have heretofore been made in the location of lines possessing moment, great care should be exercised in the selection of new lines, and only those should be constructed as may be actually needed and capable of securing a business commensurate with their cost; and that one of the best evidences whether a certain line is needed or not is the coöperation of the people along such line, and unless such coöperation equals at least one-half the estimated cost thereof, this convention would advise great moderation in the deliberations of any company before entering upon such construction.

"*Resolved*, That the narrow-gauge railroad is the road for the people, that its cost comes within their reach, and it offers to them a transportation facility superior to that offered by any other means."

On motion of Gen. Negley, they were taken up *seriatim* for adoption, but the discussion was interrupted by the arrival of the hour for recess, 1 o'clock, and the delegates retired to dinner in the main hall of the Lookout.

On reassembling, the first resolution was adopted without further discussion. Gen. Negley wanted the second to include a declaration as to the safety of narrow-gauge trains, and that they can maintain safety at as high a rate of speed as the standard, with an equal condition of track. This brought out a good deal of discussion. Col. Smith, of Dayton, and Mr. John Lee had no doubt that an equal rate of speed could be maintained, but it nad not been fully demonstrated, because it had not been tried in common practice. Each had known trains to be run safely at the rate of forty miles per hour, with large loads of passengers, but they were opposed to indulging in any expressions in the resolutions which can so far be regarded as mere theory. The motion was withdrawn.

Mr. Hays wanted the first specification of the resolution to specify positively the cost at which narrow-gauges can be built. He believed the phrase "two-thirds the cost of a standard gauge" to be ambiguous. Some standard gauges cost as high as $70,000 per mile, and the majority $40,000 or more. This awakened much more discussion, and Mr. Hays was finally satisfied with the insertion of the clause "all other things being equal," and the resolution was then adopted.

On the third resolution Mr. Kellogg expressed little sympathy with the transcontinental line. The specialty of the narrow gauge is its cheapness and adaptability to any character of country. We can build two feet or 2½ feet gauges so cheaply, and adapt steam to the ordinary traffic of the country so easily, that the common use of animals in hauling can be dispensed with to a great extent.

Mr. Gifford and Gen. Negley defended it because there could be no doubt of a largely increased trade on the narrow gauges if they reached great distributing points, such as Cincinnati, St. Louis, Chicago or the seaboard.

Mr. Kellogg said such connections would bring the narrow gauges into competition with the great moneyed trunk lines, which could afford to reduce freights for a time to such figures as to starve out the narrow gauges. The field of the narrow gauge is essentially local. There are coal mines on the speaker's road enough to provide business for it for 500 years. We do not need to reach the great distributing points.

Mr. Lee, in behalf of his own road, which is intended to connect Indianapolis and Chicago, defended the clause.

Major Byrne, of the Cincinnati & Eastern, said that direct connection with trade centers is a necessity to such a road as his, which pays more for its seven miles of Cincinnati connection than the expenses of operating the whole of the company's line.

Mr. Burroughs, of the College Hill Railroad, said it was just that ambition that would ultimately destroy the narrow-gauge system. The very day we attempt to compete with Vanderbilt and Scott, that day is the system doomed. Narrow gauges ought to be content with the development of a profitable local trade, and the consciousness that like the dews of heaven they bring good to every man's door.

Mr. Hurlbert said the resolution is a confession of weakness.

Mr. Albert Hill, consulting engineer, of New York, spoke of the expenses incurred in increasing the length and competing with standard gauges. There are the palace cars, the sleeping cars, and hotel cars, the fast-freight line companies, to absorb the largest share of the earnings of the road.

Major Byrne held that the standard gauges will prey more upon the business of narrow gauges if the latter do not stretch out to the great markets. There is nothing that can prevent the system from spreading from the Atlantic to the Pacific, and though they may not seek it, there must necessarily be competition.

The resolution was adopted, and Colonel Hurlbert said in disgust:

"If this convention says the moon is made of green cheese, I'll be —— if I don't agree to it."

The other resolutions were then adopted without debate, the ambitious wing of the convention applauding heartily on the adoption of that declaring that narrow gauges are "not auxiliaries."

Mr. Hill, of New York, offered a resolution looking to the appointment of a bureau in New York, to which all railroads represented in the convention should make a monthly report of their business, for the purpose of facilitating the disposal of bonds.

It was at first favored, but Mr. Hopkins opposed the proposition, as one to which no business man would agree to in relation to his own business. If you have a good road, you can place your bonds easily enough; if you have one whose securities you want to fly higher than a kite, then this is the method.

Mr. Hill said that all other railroads that sold bonds presented such reports in that manner.

Mr. Hopkins—Nobody believes their reports, and if they do they believe that which they cannot rely upon.

The resolution was finally adopted in the following modified form:

Resolved, That the Central Executive Committee of this convention be and are hereby recommended to consider the advisability of establishing a Bureau of Narrow-Gauge Statistics, and to report the result of their considerations at our next meeting.

A motion by Mr. Miller, of Pittsburgh, was adopted, to appoint a committee of three to consider and examine the various modes and devices for transfer of loads between gauges, and report recommendations at the next meeting. Messrs. Miller, of Pittsburgh Southern; James Mellon of the Ligonier Valley Railroad and Major Byrne, of the Cincinnati & Eastern, were appointed.

The Central Executive Committee was appointed as follows: Col. E. Hurlbert, Bedford, Ind.; Gen. James S. Negley, Pennsylvania; H. M. Gastrell, Mississippi; J. M. Graham, Kansas, Ill.; Major John Byrne, Cincinnati; B. E. Wells, Dalton, Ga.; Capt. John Scott, Brownstown, Ind.; A. F. Hill, New York; George M. Priest, Henderson, Ky.; Col. S. N. Yeoman, Washington, C. H., O.; D. E. Small, York, Pa.; W. O. Rockwood, Indianapolis; B. F. Bardwell, Ohio.

The Executive Committee were instructed to prepare subjects for discussion for the next convention.

By request, Col. Hurlbert reviewed some of the advantages of the narrow-guuge system. Among them were the ease and cheapness of repairs. Among these he cited that of tamping, in which there is a difference of two feet to each tie, or 11,200 feet to the mile. In the case of the Ohio & Mississippi road, of 340 miles in length, there would be in the tamping of ties, three times a year, over 11,457,600 feet of tamping more than would be required on a narrow gauge of equal length. He spoke of the success of his road, the Bedford, Springfield, Owensboro & Bloomfield, which, on a length of forty-six miles, earned an average not more than $50 to $60 a day for the first year, and yet paid expenses.

The convention then adjourned to meet in Cincinnati on the 23d of October next.

President Scott on Pooling.

Referring to President Scott's visit to Saratoga as arbitrator between the Canadian lines, the Philadelphia *Times* of July 22 says:

"In view of the fact that a general conference with a similar object will take place between the managers of all the great trunk lines as soon as the matter of these roads of Mr. Vanderbilt's and their connections is finally adjusted, Colonel Scott's views regarding the pooling of competitive business among the main lines are of interest.

"In a long conversation on this subject prior to his departure for Saratoga Colonel Scott said: 'It has been argued that if the railroads were to agree upon certain rates, to be maintained by dividing the tonnage in certain proportions among the different lines, the result would be high charges to shippers, and therefore lower prices to farmers and other producers, and that in this way such a policy would be prejudicial to the agricultural interests of the country. No such evil would result. It is not the interest of the farmers any more than of any other class that railroads should be compelled to carry freight at prices which do not pay the cost of transportation. Unless the railroads receive a sum equivalent to the cost of doing the work and a fair and reasonable profit upon the capital actually invested in the lines, they will not be able to maintain themselves in proper shape to do the business offered to them, and consequently it will be impossible for them to haul the freight promptly and cheaply. And more than this, the roads becoming deteriorated will not be able to carry passengers promptly and safely. Thus will be caused great risk not only to property, but to life. Many of the roads in the country are not paying dividends upon their capital stock. This is due in a great measure to the fact that prices have been received for carrying competitive traffic either below or barely equal to the cost of transportation. It is idle to expect that capital will be invested in enterprises which are forced to remain unproductive. Unless the people who put their money in railways feel assured that they will secure the same returns that people in other branches of business do they will cease to make such investments, and the loss will result, not to them, but to the sections of country needing development, and which will not be developed without the use of such capital. Consider the results to the merchants. It is certainly their interest that all shippers should be placed on an equality. While the system of drawbacks and rebates was in force one man received an unjust advantage over his competitor. Men cannot transact mercantile business unless they are all placed upon the same level, and the man who purchases in New York, Philadelphia, Baltimore or Boston ought to pay the same rate of freight upon his goods as his neighbor in the same branch of business.

"'Every other plan,' continued Colonel Scott, 'has been tried to secure permanent and steady rates except that of pooling the east-bound business, and the experience of the Eastern lines has shown that this pooling and dividing it upon certain agreed percentages is the only plan to accomplish the result. It is out of the question for the railways, no matter how they may combine, to charge unreasonable and excessive rates. This is shown by the fact that since the formation of the west-bound pool the freight rates from the seaboard to western points have been less than the average before the creation of the pool, and further in the case of anthracite coal, where the product is confined to a very limited area, and where the production is almost entirely in the hands of five or six large corporations, even in that case, where the companies had agreed for the purpose of preventing over-production, the price now charged to the consumer is very low, and only a little above the actual cost of production. The railway companies, although often unthinkingly regarded as mere artificial corporations not amenable to public control, are composed of hundreds of thousands of stockholders, most of whom have interests in the other business pursuits far in excess of the amount of the particular stock they may own in the railway, and any policy which looked to the establishment of unreasonable and exorbitant rates would thus bring greater disadvantages and losses to them personally than the profits could possibly get from high rates on traffic. Therefore their interest is common with that of other business people. We have the railways carry traffic at reasonable and permanent rates, which will pay the cost of doing the work and yield no more than a fair return upon the capital actually in the enterprise. Under the present system of unrestrained competition not only great inequalities occur, but many branches of business closely allied with railways are suffering severely by reason of the unremunerative rates received for handling traffic. A large amount of vessel property on the lakes is entirely unproductive and the vessels are either rolling at their wharves or carrying at rates which do not pay the cost of the service.

"'No country can be prosperous,' the railway President continued, 'where $4,000,000,000 invested in any one enterprise, as in the railways, remains unproductive, and the only object in pooling competitive business is to secure a just and fair return to the owners of railway property.'

"Col. Scott adverted particularly to the economies which have been effected in the management of the railways within the past five years, and said that the introduction of steel rails and more durable road-bed had enabled them to keep their tracks and equipments in better condition at greatly reduced cost. Referring to recent legislation he said:

"'It clearly shows that the unwise policy pursued in many of them has worked out its own cure, and the people of Illinois and the Northwest recognized the community of interests between the railways and other branches of industry and are not disposed to continue an antagonistic position toward them. The same question came up in England some years ago and was discussed at great length. The same fears were then entertained that an agreement between the railways would result in exorbitant charges upon traffic, thus damaging the great manufacturing and other industries of that country, but as Mr. Adams, of Massachusetts, has clearly shown, the result has been exactly the contrary. The railways have become each year more and more amenable to public opinion, and the officers who were empowered by the government to hear complaints and redress injuries find that in almost all cases a simple suggestion from them is sufficient to correct an abuse, rendering it unnecessary for them to resort to the powers with which they are invested by law. The Railway Commissioners of Massachusetts had the same experience, and it needs that the question be looked at dispassionately and calmly in order that results may be worked out which shall be to the best advantage of every interest in the country. There can be no antagonism between the railways and other branches of industry. They are allied so closely that an injury to one must result in loss to the others. I feel sure that the sound judgment of the American people will sustain the railways in inaugurating a policy which will place all shippers upon the same basis, and secure to the railways only reasonable returns upon the money invested in them.'"

Waifs and Strays.

In the rooms where "baggage for departing trains" is taken, on the east side of the platform of the Pennsylvania Railroad depot in West Philadelphia, space is set apart for unclaimed goods. These mean every species of article that travelers carry with them on railway trains. The absent-minded man, who starts away with a satchel full of linen and an umbrella, puts the former in the rack over his head and the latter in the seat beside him, and gets to reading the paper. The train pulls up at the depot in Philadelphia. The absent-minded man is deep in an interesting article, and is the last to leave the car, and he leaves it in a hurry, for he wants to see to his trunk, get a lunch and catch the train for New York. He emerges from the car empty-handed, whisks up to the baggage car, sends his trunk where he wants it, runs into the restaurant, scalds his mouth with a cup of steaming coffee, and takes the nearest and most natural course to indigestion by swallowing a hot biscuit and pouring in a glass of ice water on top of it, catches up his paper, flies away to the New York train, which in turn flies away with him.

Meantime the woman who scrubs cars enters a particular car of the newly arrived train and finds somebody's satchel and umbrella. She turns them over to the baggageman, and the baggageman turns them over to the department for unclaimed goods. The department holds them till the umbrella begins to get moth-eaten, by which time it is the general belief that the owner isn't going to appear, when it is handed over to the woman who found it or to some of her co-laborers, to whom it is severally acceptable. The valise becomes a perquisite for a baggageman or a truckman, who takes it and is thankful.

A CURIOSITY SHOP.

The corner for unclaimed goods is half a rod deep with umbrellas and canes. Below them, on shelves, in brown paper parcels, are linen dusters, alpacas and spring overcoats and hats. Scattered around are a wagon-load of articles as varied as the tastes and occupations of men; cigar boxes with contents untouched, fans, tongs, masons' trowels, dog muzzles, books and pamphlets and blanks and papers, valises, carpet-bags, satchels, old red pocket handkerchiefs done up in bundles, baby's rattles, a folding chair or two and some rubber shoes.

The umbrellas and canes were, as seen yesterday, of every kind—crook-handled, knob-handled, straight-handled, handles of ebony, iyory, nickel and polished wood. Some of the umbrellas were good, but the majority were of the cheap stamp, and some suggested the suspicion that their owners were only too glad to get away from them. So with the valises. A few were good, but the bulk of them were old and rusty and the baggagemen called them "pinch sides." They looked as though they had stood near a fire. The carpet-bags were of the old ante-railroad style. It was noticeable that there was nothing in all the group that might be called excellent, excepting two silk umbrellas, one with an ebony handle. These the baggagemen said would very likely be claimed. "They are too good to go unclaimed," remarked one. "Goods that's unclaimed," said he, "is generally goods that isn't worth much. If there is anything worth much the owner'll be after it. That's been the experience all along. I've got a drawer full of trinkets over there. Come, and I'll show you 'em."

A DRAWER FULL OF WHAT-NOT.

The drawer contained one revolver, a huge jack-knife, a brass watch, a large piece of moss agate, an old-fashioned pistol, a duplex counterfeit detector, about two dozen note books, between fifty and sixty pocket-books, none very good; a patent cigar-lighter, rusty and useless; a set of gold sleeve-buttons, in a case; half a dozen imitation morocco fans, a dozen pair of spectacles and a child's ivory-handled whistle.

Most of these articles were lost at the Centennial. The great bulk of unclaimed goods come in during summer, when people are traveling most. In winter little is picked up in the cars. About fifty per cent. of the goods are claimed. The railroad company has no power to sell the balance by auction as the express companies have. When the accumulation becomes so great as to take up an undue amount of space the goods are distributed among the baggagemen and truckmen. Any goods that nobody will have are thrown out. The centennial year was the greatest ever known for unclaimed goods. Umbrellas and canes were particularly plentiful. Valises and satchels and hat-boxes were likewise abundant. Every article that is lost has a ticket attached the moment it gets into the baggage room, telling when found and on what train. In the pocket-books found there is once in a while money. If the sum is large it is sure to be claimed, but if small the owner seldom turns up.—*Philadelphia Times.*

—Col. Ezra Miller, inventor of the Miller platform and coupler, is a candidate for a nomination for representative in Congress from the Fifth District of New Jersey. He resides at Mahwah, in Bergen County.

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE NARROW-GAUGE CONVENTION.

On other pages of this number of the *Railroad Gazette* will be found a tolerably full report of the proceedings of the above meeting, which was held, according to announcement, in Cincinnati on the 17th and 18th inst. It will be remembered that in the first call for this meeting the officers of narrow-gauge roads only were invited to attend. The unfairness of this was pointed out if, as the call said, there was to be "a comparison of narrow-gauge lines with standard-gauge lines in economy and efficiency," and if, as was also stated, there was to be "a thorough investigation of the subject." A subsequent call was then issued, in which "all interested in railway transportation—irrespective of gauge", were invited to attend.

The Chairman of the "National Executive Committee," whose name was appended to the latter call, informed the writer that it was unauthorized, and that he did not approve of such a general invitation. Why, he said, under that call "the wide-gauge men might have come there and captured the convention." Whether they could have done that or not the world will never know, because few, if any, wide-gauge men attended the meeting. If they had, it was obvious that their welcome would have been somewhat like that which an earnest Republican would receive at a Tammany Hall Democratic meeting, and they would have been listened to somewhat in the same spirit as good, earnest Methodists would hear a thorough-going total-immersion Baptist, if he should go to a conference of the former and argue and quote Scripture in favor of his distinctive doctrine. In the call for the meeting, which was issued in circular form, and which was published in these columns July 12, it is said that the convention would offer an opportunity "to practically compare" the two systems in various ways. To give force to this the word "practically" was in each case printed in full-faced type. Notwithstanding this, there was no such comparison, if we except Colonel Hurlbert's cross-tie argument, and Mr. Ramsey's statement, which was, by the way, the most intelligent presentation of the arguments in favor of "the system" made at the convention. With the exception of their remarks, and some similar statements by Major Byrne, the whole proceedings were one arid waste of buncombe. When the meeting was opened the call was read, so that its objects might be understood. The organization was then effected, and then the delegates were "welcomed" to Cincinnati four or five distinct times by different speakers. There is no reason to doubt the sincerity of the hospitality of that good city; on the contrary it was evidently very hearty; but in a convention which had, or should have had, some very practical work to do, super-abundance of welcoming on this occasion led to the suspicion of a lack of other matters for consideration.

All conventions must be conducted, in a great measure, by some preconcerted plan made by a compartively small number of its members; either a committee, a caucus, or a ring, or whatever that small number may be. This was eminently the case in the Narrow-Gauge Convention. The business was all prepared—cut and dried in fact—by about half a dozen persons who were instrumental in calling the meeting, and from the very beginning it was obvious that no comparisons or discussions which would be unfavorable to the narrow-gauge "system" were expected, and no one had the temerity to try whether adverse opinions would be heard. Although, doubtless, there were many persons present who came there to get information, and who would have listened attentively and tolerantly to any one who expressed opinions quite opposed to their own convictions, yet it seemed obvious that the real purpose of those who had charge of the meeting was to provide ammunition to the projectors of narrow-gauge roads in different parts of the country, in their various compaigns with the farmers and others for the purpose of securing their subscriptions.

The manner in which narrow-gauge roads are built in some of the Western States was stated by one of the Cincinnati dailies, the *Enquirer*, in an editorial in which some recommendations were made to the Narrow-Gauge Convention. It said:

"The recipe for building narrow-gauge railroads in the West seems to have been about as follows: Select a section of country where there are only farmers who know nothing of railroads or railroad building. Organize your company with one of them as a figurehead. Get subscriptions from the community for $6,000 or $8,000 per mile, and issue bonds for a like additional amount; run your road through the valleys, around fence corners, over the smaller hills and around the large ones, moving as little dirt as possible; lay down a few ties with no ballast, and put upon them the lighest rails in the market, and the work is done. The roads built in this manner generally cost about 60 per cent. of the amount obtained in bonds and subscriptions, and the balance of the money goes into the pockets of the generous 'capitalists' who have blessed the country and the people by building their road for them, while those who are left to hold the bag find the work of running railroad trains over loose piles of dirt and round fence corners a very uncertain and unprofitable business, while the reputation of narrow-gauge railroads and their builders alike suffer. To discourage and frown down this system, and to promote the art of building narrow-gauge roads well and honestly, and only where they are needed, should be the work of the convention."

That the reiterated statements made in the convention that to construct and operate narrow-gauge railroads costs only *two-thirds* as much as standard-gauge roads might be made very useful in "a section of country where there are only farmers who know nothing of railroads or railroad building" is quite obvious. As one speaker said, what is needed is a hand-book of narrow-gauge railroad construction, which could be used to disseminate "information." It was to the preparation of such a hand-book that the convention addressed itself, by appointing committees to investigate and report on various subjects at the next meeting, to be held in October. Now, it is not intended to make the assertion, even by implication, that all those who attended the meeting were the kind of "capitalists" to which the *Enquirer* referred. On the contrary, it was obvious that a very large proportion of those in attendance—and it was remarkable how many *old* men were present—evidently came there to get information; what is complained of is that these people came asking for bread and received stones.

The real questions at issue between those who do and those who do not believe in the narrow-gauge system were not discussed at all, and no light whatever was thrown upon them. A good deal of rubbish and many mental cobwebs would have been cleared away by an intelligent discussion of questions somewhat as follows:

1. *Does theory show and practice prove that curves of materially shorter radius can be used on narrow than on standard-gauge roads?*

2. *Does the narrow-gauge system permit the use of a steeper grade than the standard-gauge system?*

3. *What is the difference in the weight and cost of locomotives of the same capacity, that is, with the same size of boilers, cylinders and wheels, for a three-feet and for a 4 ft. 8½ in. gauge?*

4. *What is the difference in the weight and cost of freight and passenger cars, of the same capacity, and affording the same accommodations for traffic, for the narrow and standard gauges?*

5. *What length and size of cross-tie would be required to give equal stability to a track of 3 ft. gauge and for one of a light road of equal capacity with a 4 ft. 8½ in. gauge?*

6. *What should be the weight per yard of the rails for the two gauges, so as to have equal endurance if the locomotives and cars are of the same capacity on each?*

7. *What would be the difference in the amount and cost of the grading of a 3 ft. and 4 ft. 8½ in. gauge road with the same vertical and horizontal alignment, the capacity of the roads being alike and the cross-ties of such length as to give equal stability to the track in each case?*

8. *With rolling stock of the same capacity, what would be the difference in the cost of bridges?*

9. *With rolling stock of the same capacity and an equal amount of traffic, what would be the difference in the cost of maintenance of track?*

10. *The conditions being the same, would there be any difference in the cost of operating and repair of rolling stock for narrow and standard-gauge roads?*

These are the real questions at issue, and on which the Narrow-Gauge Convention shed no light. They are commended to the consideration of the committees which are to report at the meeting next October.

It is a curious mental trait of some advocates of narrow-gauge railroads that their statements are always made with a kind of Pickwickian reservation. Thus, in conversation with one of them he said that when they said that a narrow-gauge road costs two-thirds less than a standard-gauge road, what they meant was that the former costs that much less than *ordinary* standard-gauge lines; which, put into more precise language, would mean that a light narrow-gauge road costs that much less than a heavy standard gauge, which probably no one will dispute. Now, supposing that the persons assembled at Cincinnati had recognized the true meaning of their indefinite and sweeping claims of advantage for the narrow-gauge system, and had passed two resolutions like the following: "*Resolved*, 1. That it is the opinion of this assembly that a light narrow-gauge railroad costs two-thirds less than a heavy standard-gauge line; 2. That the difference in cost of a light narrow-gauge road and one of a standard gauge of the same character is almost inappreciable;" it is clear that their position would be ridiculous, and yet when closely pressed it will be found that these two resolutions represent very exactly what many of them really do believe, perhaps somewhat unconsciously; and if those who are not clear about the faith that is in them will carefully consider the above ten questions they will find that there is no escape from the conclusions as stated in the resolutions. The experience on the Gilbert or Metropolitan Elevated Railroad in New York, on which 368 trains per day are run up the line and 368 down each day over four curves of more than a quarter of a circle and 90 ft. radius, compels an unqualified answer *no* to the first question.

Mr. Latrobe's experience in running grades of 528 ft. per mile over the Kingwood Tunnel, on the Baltimore & Ohio Railroad,* gives another decided *no* to the second question.

The answer to a letter of inquiry to locomotive-builders who make both narrow and standard-gauge engines will be "*none*" with reference to difference of cost, and 500 to 100 lbs. difference in weight.

A cash order for cars of the same strength and capacity may be "placed" at the same price for narrow or standard-gauge roads, which will answer question 4.

With reference to question 5 it is evident that a cross-tie six feet long would give as much stability on a wide as it would on a narrow-gauge; but as the rails, if placed 4 ft. 8½ in. apart, would come very near the ends of the ties, it might be desirable to increase their length one foot, which may be placed to the credit of the narrow-gauge; but the additional bearing surface thus secured and resulting economy in repairs must go to the credit of the standard-gauge.

To the sixth question the narrow-gauge advocates must show why a rail will not bear as much load on a wide as it will on a narrow-gauge before the answer can be in favor of their doctrines.

The additional foot in length of cross-ties implies that much more grading, and will amount to from three to seven per cent. in the quantity, and about half that proportion in the cost, amounting to less than one per cent. of the total cost of the road, which advantage is admitted to the narrow gauge in answer to question 7.

* See *Railroad Gazette*, Dec. 5, 1874.

Any bridge-builder will answer question 8.

The managers of narrow-gauge roads can answer question 9 if they will keep in mind that 7 ft. ties will not require tamping as often as those only six feet long under the same traffic and loads.

Question 10 is one for master mechanics to answer.

If at the next convention of narrow-gauge advocates they should undertake to answer these questions *and give their reasons* for the answers, one of two things will happen—either the absurdity of their position will be made manifest, or they will see the error of their opinions and that it is not true that narrow-gauge roads cost materially less than those of a wider gauge, and if this is not true, there is no reason for building narrow-gauge lines or holding conventions like the one in Cincinnati.

The Michigan Central in its New Relations.

The Michigan Central and the Lake Shore & Michigan Southern, under the new administration, have made arrangements by which competition between them will be avoided for probably the larger part of their local traffic. Besides the places which we named last week, there are several others where the business will be divided, some of them not being common points, but places so near to each other that they compete for pretty much the same business. The basis of the division is the traffic actually obtained by the roads respectively in the years 1876 and 1877, the Lake Shore from Chicago to Toledo being taken as the equivalent of the Michigan Central between Chicago and Detroit. If either road receives more than the proportion of the business which it got in 1876 and 1877, it will be permitted to retain one-half of the earnings from it, as an allowance for the cost of carriage. This will be in most cases less than the actual cost, and will take away the chief motive for working to divert business from one road to another, so that it may be expected hereafter to divide itself naturally.

The traffic from the Pacific railroads, passenger as well as freight, is also divided in certain fixed proportions, and the two roads will have a common agent at San Francisco.

Both roads are to discontinue all agencies, passenger and freight, in Boston and New England; the Merchants' Dispatch will represent all the different lines that run over the Boston & Albany—Blue Line, Red Line and Canada Southern—in Boston, but the Boston & Albany is to attend to the agency business proper: it has agreed to do that, and the Fitchburg Railroad will be expected to attend to that which passes by the Hoosac Tunnel Line.

Provision has not yet been made for the New York and Chicago agencies, but probably something will be done to concentrate and simplify them. It appears that, recently, the through traffic eastward has been much greater over the Michigan Central than over the Lake Shore, when that coming to it from the Joliet Cut-off is included. This cut-off brings traffic from the Chicago & Alton at Joliet (37 miles from Chicago) and the Illinois Central at Matteson (28 miles from Chicago) to the Michigan Central at Lake (35 miles from Chicago); it substitutes a country line 45 miles long as a connection between the Michigan Central and the Chicago & Alton for a line through Chicago 72 miles long, and a line 25 miles long between the Michigan Central and the Illinois Central for a line through Chicago 63 miles long. It connects with the Chicago, Rock Island & Pacific at Joliet also, and would save 30 miles in transfers between that road and the Michigan Central; but we believe that it has not been much used for that purpose, as the Red Line runs over the Rock Island road, and a large proportion at least of its through traffic to and from the East has gone by that line, which runs over the Lake Shore. The Michigan Central's line, the Blue Line, runs over the Illinois Central and the Chicago & Alton, and naturally, considering the distance saved, and especially the avoidance of the passage through Chicago, where there is only too much work for the tracks and delays are sometimes possible—naturally the cars consigned through over the Michigan Central and these two roads have been very largely sent by this cut-off. The rational thing to do now, it would seem, would be to extend the cut-off the three or four miles between Lake and the Lake Shore road, and have it used in common hereafter by both Michigan Central and Lake Shore, when there is any advantage in it; but that is not proposed, we believe. But the omission of the traffic from the Joliet cut-off from the statements of Michigan Central through traffic eastward has made them convey a wholly false impression of the share of the traffic which it receives from roads west of Chicago. It is possible, however, that a a similar, though probably not nearly so great, error has been made by omitting the transfers made between the Lake Shore and the Rock Island roads at Englewood—which is just outside of the Chicago city limits—from the statements of Lake Shore through traffic eastward.

The settlement of the division of Michigan Central traffic between the Great Western and the Canada Southern was rather a delicate matter. It was not a case that could properly be decided on the basis of the past course of business. Heretofore, for most of the time since the Great Western was completed, there have been special contracts between it and the Michigan Central for cultivating business together as one line. The Michigan Central virtually worked for the Great Western. Now a time had come when certainly no further exclusive contracts would be made with the Great Western by the Michigan Central, and the most the Great Western could hope was that exclusive contracts would not be made with the Canada Southern, its comparatively new rival, which is chiefly owned by the present managers of the Michigan Central. Apparently, Colonel Scott, the arbitrator, made his allotment as a mean between what the Great Western used to get, and what hereafter the Canada Southern would be able to get if the Michigan Central managers should exercise their full power in directing the traffic where it would do them the most good, without reference to the Great Western. The latter is to have 55 per cent. of the freight and 60 per cent. of the passengers going east from the Michigan Central. This is doubtless a great gain over its past share for the Canada Southern, but probably much more in passengers than in freight traffic. The Great Western, with its line directly in front of Niagara Falls, has always been a favorite passenger route; and passenger business cannot be directed to connecting roads to anything like the extent that freight can be by the road on which the transportation begins.

The division of traffic here made is simply of the total passing from the Michigan Central to the New York Central and the Erie by these two roads; there remains the Grand Trunk with a third road between Detroit and Buffalo, besides its line to New England north of Lake Ontario. It seems to have been generally assumed that the Grand Trunk is to be ignored and given no facilities over the Michigan Central. We do not understand that this is the case, but that the Grand Trunk is to be afforded all reasonable facilities for obtaining Chicago traffic by way of the Michigan Central. It is not to be supposed that it will be granted special facilities by this road; for instance, the Michigan Central can hardly afford to pro-rate a cut rate or even an agreed rate lower than that by its other more direct connections, when the reduction is made because of the disadvantage of greater distance, and thus the Michigan Central is a smaller proportion of the whole distance than by the direct route. For instance, Chicago to Boston by the Michigan Central, Great Western, New York Central and Hoosac Tunnel Line is about 1,000 miles; by the Michigan Central, Grand Trunk and one of its connections it is about 1,200 miles. By the short route the Michigan Central is entitled to $\frac{834}{1000}$ of the through rate; it is difficult to see why it should be asked to accept $\frac{834}{1200}$ of the rate between the same places by the other route, and still more so, when that rate is lower by the long route, and it is in no respect to the advantage, directly or indirectly, of the Michigan Central, that business should go by this route. When the rate is a dollar per hundred by the short route and 90 cents by the other, as is sometimes the case, the Michigan Central's proportion of the former would be 28.4 cents; by the latter, only 23¾ cents.

The Grand Trunk, it is reported, is not satisfied with the present condition of things, and is negotiating for a connection which will give it an entrance into Chicago independent of the Michigan Central. There seems to be good reason for believing that there have been negotiations with the Baltimore & Ohio for the use of the western end of its Chicago line, access to which would be had by the Chicago & Lake Huron road, which crosses it 58 miles from Chicago. To make this line available it will be necessary to construct a new line for about 50 miles between Flint and Lansing, in Michigan, and after all it would not have the great stock of cars, the vast established traffic, and the friendly connections west of Chicago which make the Michigan Central so desirable an ally. It is quite possible that the Grand Trunk's movement is to secure the means of protection, which it will exercise only in case it is dissatisfied with its eventual treatment by the Michigan Central, and convinced that it will not be given a fair chance to use it. It certainly will be a great pity if any more new railroad is built to accommodate through traffic.

On the whole, besides the economy which can be secured through the management of the Lake Shore and the Michigan Central by one administration, the prospect is better for the maintenance of harmony between them and their rivals. Of course harmony is not secured by the combination of two out of four or five lines, but the liability to discord is somewhere in proportion to the number of those who contend for a given traffic. In this case the two roads united control by far the larger part of the New England traffic, and a very large part of the New York traffic. Together they ought to be able to exercise a powerful influence in favor of harmony.

June Earnings.

June earnings are reported in our table for 21 railroads, with 12,072 miles of road, or about 15 per cent. of the total mileage in operation in this country. The number is much smaller than for any previous month this year, and we fear it is to be accounted for by the fact that June earnings were in many cases unfavorable, while in previous months the earnings compared very favorably with those for the corresponding months last year.

The 21 roads reported in our table earned in the aggregate 1.9 per cent. more in June this year than last; but as they had 3.6 per cent. more road, the earnings per mile were less. Actually they fell from $426 in 1877 to $419 this year, or 1.6 per cent., and earnings were not favorable in June last year.

Of the 21 roads reporting ten show larger earnings this year than last, and nine larger earnings per mile of road. The largest increases per mile of road are 37½ per cent. on the Denver & Rio Grande, 24 on the Burlington, Cedar Rapids & Northern, 23¼ on the Iowa lines of the Illinois Central, 22 on the Atchison, Topeka & Santa Fe, and 20 per cent. on the St. Louis, Kansas City & Northern. The decreases are smaller in proportion, only two being more than 10 per cent., these two being the Cleveland, Mt. Vernon & Delaware and the Missouri, Kansas & Texas, which earned nearly 20 per cent. less this year than last in the month of June.

Of four lines which carry produce to Chicago, having an aggregate of 3,369 miles of road this year, and 180 miles more than last year, three show an increase, but their aggregate increase is only 3.8 per cent. Of five St. Louis roads, whose aggregate length was 1,786 miles both years, three show an increase, and their aggregate increase was 4 per cent.

For half-year ending with June, we have reports from 23 roads, including two in Canada, with 13,917 miles of road. The aggregate earnings of these 23 roads were 9.2 per cent. greater this year than last. Their average earnings per mile of road for the half-year increased from $2,594 in 1877 to $2,725 in 1878, or 5.1 per cent. Sixteen of the 23 roads show an increase of total earnings, and 15 an increase in earnings per mile of road. The very large increases per mile of road are 59.1 per cent. on the Burlington, Cedar Rapids & Northern, 42.1 on the Chicago, Milwaukee & St. Paul, 30.7 on the Atchison, Topeka & Santa Fe, 26.3 on the Denver & Rio Grande, 24.9 on the Iowa lines of the Illinois Central and 23 per cent. on the Toledo, Peoria & Warsaw. The largest percentage of decrease is 16.5 per cent. on the Cairo & St. Louis. The St. Louis roads show an increase of 1 per cent., the Chicago roads one of 18 per cent. in their aggregate earnings for the half-year.

As a sufficient idea of the earnings cannot be had by a comparison of two years alone, we have below made up a table of the earnings per mile of road for the month of June for the four years past, for such roads as have reports accessible:

June Earnings per Mile of Road for Four Years.

	1875.	1876.	1877.	1878.
Atchison, Topeka & Santa Fe	$205	$263	$261	$319
Burl., Cedar Rapids & Northern	...	251	188	233
Cairo & St. Louis	176	164	137	124
Central Pacific	1,344	1,250	817	777
Chicago & Alton	588	694	529	515
Chicago, Milwaukee & St. Paul	530	627	420	433
Cleveland, Mt. Vernon & Delaware	...	214	224	180
Denver & Rio Grande	294	289	214	294
Illinois Central, Illinois lines	...	723	547	513
Ind., Bloom. & Western	239	375	248	245
Int. & Great Northern	164	141	146	140
Kansas Pacific	365	304	377	332
Missouri, Kansas & Texas	282	297	328	264
St. L., A. & T. H., Belleville Line	512	525	494	543
St. L., Iron. Mt. & Southern	430	339	400	370
St. L., Kansas City & Northern	354	435	324	388
St. L. & Southeastern	186	253	223	246
Toledo, Peoria & Warsaw	329	574	338	324
Wabash	...	636	520	469

Of the 15 roads whose earnings per mile are given in 1875, nine had greater earnings then than this year; of the 19 roads reported for 1876, ten earned more than in 1878. Two roads (Atchison, Topeka & Santa Fe and Belleville Line) earned more last June than in any other of the four years, and no less than *nine* have earned less this last June than in any other reported in the table.

In fact, June earnings must have been very unsatisfactory to a large proportion of the roads, including a large class carrying through traffic, which are hardly represented at all in our table. A number of Northwestern railroads have had a good traffic and fair rates, and have made money, but a great many roads which have had a tolerable traffic have got too little for carrying it to make the result satisfactory, and for such the net earnings of June were probably still more unsatisfactory than the gross earnings.

Foreign Railroad Notes.

Recently in Belgium the government let contracts for 31 locomotives to the seven principal works of the country, at the rate of $8,711 each. No further information is given of their dimensions than that they had six wheels connected, of about 4 ft. 3 in. diameter. Contrary to the usual custom, no notice of the letting was given, but there seems to have been a conference with the builders to ascertain the lowest price accepta-

ble to them all, in order that the work might be distributed to keep the works busy. It is reported, however, that matters are not as bad as they have been, and while the iron manufacturers continue to complain of a dearth of orders, buyers also complain of delay in fulfilling their orders. This may indicate a reduction in the capacity of the works.

Two Dutch railroad companies are experimenting with the iron substructure proposed as a substitute for ties by Serres & Battig, of Austria, which seems now to be favored more than the Hilf system, of which latter there are considerable sections of road in Germany and Belgium. Serres & Battig use old rails almost exclusively in their structure, we believe.

The Emperor Ferdinand Northern Railroad of Austria has recently appointed, provisionally, 25 women for the administrative service. The Austrian State Railroad Company now purposes to admit to its service 50 women, in ticket and telegraph offices and storehouses. They must not be more than 35 years of age, and submit to a suitable examination as to their qualifications, and will be paid $200 to $250 a year. The Austrian Southern has for some years what it calls a "ladies' office," in which the clerks are daughters and wives of deserving employés, who are engaged in duties requiring writing and computations, with good results.

The Russian Ministry of Roads and Communications has established at the St. Petersburg Engineering School a great technical laboratory, provided with apparatus for testing all kinds of materials for construction, such as stone, cement, metals, wood, etc. Any one can have materials tested there for a small sum. The whole establishment seems to be modeled after that of Professor Thurston at the Stevens Institute in Hoboken.

The Russian government had to have nearly all its military transportation performed by the Roumanian railroads. It made a contract with them to do its work for 40 per cent. less than the rates to the public. Having made the contract, the railroad company at once advanced its rates to the public 50 per cent. Recently the Russians have tried to send away their sick and wounded over a road which they built themselves from Bender to Galatz, avoiding entirely the use of the Roumanian roads. But it is said that this road is in such horrible condition that in places trains can be run but *two* miles an hour, only very short trains can run at all, and it takes a week to send 300 or 400 wounded men over it.

On the oldest of the Russian railroads recently, a surgeon connected with the road removed the bandage from the leg of a switchman who had been wounded earlier than he should have done, "chiefly from motives of economy," it is reported. The switchman shortly after bled to death, and on complaint of a government inspector the surgeon was dismissed. But at the next session of the directors of the road, the surgeon was reinstated, without asking any one's permission, and, as a Russian paper remarks, "without giving any sort of explanation as to how the surgeon in question had managed to finish his professional studies within a few weeks."

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

West End.—Completed from the New Jersey Southern depot in Long Branch, N. J., to the west end of the town, 1½ miles.

Pittsburgh Southern.—Extended from Castle Shannon, Pa., eastward to Banksville, 4 miles. It is of 3 ft. gauge.

Elberton Air Line.—The first track is laid, from Toccoa City, Ga., east by south 6 miles. It is of 3 ft. gauge.

Springfield, Jackson & Pomeroy.—Completed by laying 1 mile of track at a point four miles east of Bainbridge, O. It is of 3 ft. gauge.

Northern, of California.—Track is laid on the section from the California Pacific at Fairfield, Cal., south to Benicia, 15 miles. It is owned and worked by the Central Pacific.

This is a total of 27½ miles of new railroad, making 819 miles completed in the United States in 1878, against 731 miles reported for the corresponding period in 1877, 932 in 1876, 518 in 1875, 727 in 1874, and 1,696 in 1873.

THE DENVER EXTENSION OF THE KANSAS PACIFIC may become separated from the main line if the bondholders persist in their refusal to accept the proposition of the Union and Kansas Pacific combination and foreclose their mortgage. This covers that part of the road from the 394th mile-post northwestward to Denver, 244¼ miles. It might appear that this by itself would be a most useless piece of property, as it has no outlet to the East except by the Kansas Pacific, and would be almost wholly at its mercy. If, on the other hand, the Kansas Pacific depends wholly upon it for access to Colorado, it may be replied that the Kansas Pacific and the Union Pacific are at present united, and that it will be easy to do all the Colorado business over the Union Pacific, and the local traffic of the road is almost nothing. But the Denver Extension can easily be given another outlet. Its eastern terminus is but about 50 miles north of the Atchison, Topeka & Santa Fe, and the latter enterprising company would probably be glad to secure to itself the control of Denver business which the Kansas Pacific has hitherto had, by constructing the necessary connection. The Denver Extension, however, can hardly be made a profitable road. There is scarcely any population on it until it reaches the immediate vicinity of Denver, and scarcely any traffic except the through traffic and some cattle at way stations, and the country on it is never likely to be cultivated, though the business of cattle-growing is increasing there. The through Denver traffic is considerable, and when in the hands of one company was made to pay profitable rates; but with the active competition of the Union Pacific its value, doubtless, would be greatly reduced. The latter company has so sure a resource in its main line traffic, through and local, that it would not suffer very greatly if it carried the Colorado traffic without any profit. The Denver Extension, however, is in no position to stand such competition. To it the cutting-off of profit on the Colorado traffic would mean the cutting-off of all its profits. The amount of Denver Extension bonds outstanding is about $6,400,000, besides about two years' accrued interest, or at the rate of about $26,200 per mile. But there are about 3,000,000 acres of land also mortgaged for the security of these bonds. The land, however, is all west of the 394th mile-post, which is within about 30 miles of the line between Kansas and Colorado, and land so far west, without facilities for irrigation, is almost unsalable, and doubtless never can be sold on the average for more than a few cents an acre.

NEGOTIATIONS AT SARATOGA continue, partly among the different Vanderbilt roads, and partly between them and their competitors. The final agreement as to the division of St. Louis live-stock traffic and the settlement of some questions that have lately arisen concerning the live-stock traffic of the trunk lines remain to be settled, or did as we went to press. Recently the Pennsylvania Railroad has secured a share of the Boston live-stock business, transferring cars in ferry-boats from Jersey City through New York harbor, and this has disturbed the old arrangement. The Erie seems to be agreeably disappointed because it is given a fair connection over the roads west of Buffalo which Mr. Vanderbilt controls. There has been a meeting of the trunk lines, at which it is reported that the New York Central made a claim for a larger share of the traffic out of New York than the 33 per cent. that it has had since July 1, 1877. It is said that the traffic offered it has considerably exceeded this proportion during the whole year, so that many transfers had to be made from it to the other lines in the pool, and none to it; and on this basis it seems to be admitted that the New York Central will be allotted a larger share than 33 per cent. There will probably be not much trouble about this, but there may be some in readjusting the percentages of the other lines.

Contributions.

A Correction of a Discussion at the Master Mechanics' Convention.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of July 12, third column, page 342, you cause me to say that the use of the standard car-axle on the "CARS" of this road had reduced the expenses. The word "tenders" should be substituted for cars, as I have them in use on all my tenders. They have not come into sufficient use on the cars to warrant such a statement.

Further on in the same column you cause me to say: "I would like to hear what was the best and quickest way of firing up boilers," and that I had used anthracite coal with very good results. There is utterly no meaning in it whatsoever, and I never used such a phrase, because I never have had any experience in the use of anthracite coal for locomotive purposes. It should read about as follows: The following question was submitted by Mr. Johann: "What is the best and most economical method of caring for locomotive boilers when in service?"

Mr. JOHANN—As I have submitted the question for my own information, I would much rather prefer that some of the other members would rise and state their views and experiences as to caring for locomotive boilers when in general use; for instance, the best, most rapid and economical method of cleaning out boilers, and their general care while in service to obtain the most economical results.

Please insert a card of correction in the *Gazette*, and oblige JACOB JOHANN,

Master Mechanic Western Division Wabash Railway.

Baron von Weber and the Narrow-Gauge.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Baron von Weber's paper in your issue of the 12th inst. tends, in its deductions, to mislead those in search of figures of the comparative cost of the compromise (4 ft. 8½ in.) gauge and the narrow (3 ft.) gauge. The conclusions arrived at by Weber, with his experience with European narrow-gauge railways, may be applicable to the Eastern Hemisphere, but they cannot be applied to the United States, having, as it has, by its hundreds of miles of narrow-gauge roads, proved by practical demonstration that, not only do they afford ample transportation facilities, but that in first cost they are cheaper by less than one-half. An average of 1,154.36 miles of road cost, including rolling stock, $19,178.15 per mile, ranging from $47,596 per mile on the Denver & Rio Grande Railway to $3,000 per mile on the Pennsboro & Harrisville Railway. These are extremes, the one running among the Rocky Mountains, far away from accessible markets, while the other follows the contour of a valley where comparative little grading was necessary. In Massachusetts the "standard-gauge" lines averaged $65,198.43 per mile, inclusive of equipment, while the narrow-gauge lines were built at an average cost of $26,214.92 per mile. In California the cost is equally in favor of the "new style" roads, the broad-gauge lines costing $98,298 per mile, while the narrow-gauge costs but $29,466 per mile—less than one-third. This low cost, comparatively, is not peculiar to the United States; in Canada, four roads, comprising 435 miles, average $16,198.25 per mile.

Weber's statement of the narrow-gauge cars of the Continental roads are also inadmissible here; the standard cars of this country hold less than one-half more than those of the narrow-gauge, and as the standard cars are seldom taxed to their full capacity, the proportion in Massachusetts being one ton of freight to 3.06 tons of dead weight, it will be seen that the narrow-gauge cars are ample for the freightage.

In regard to cost Weber's own argument might be applied: If a donkey will answer the requirements, where is the economy in tying up capital in a full-blooded horse?

Unless one was possessed of Mrs. Toodles' sanguine disposition, the outlay would appear to be as appropriate as her purchase of a door plate, in anticipation of a *prospective* daughter marrying a Thompson with P. Below is the average cost per mile, in 21 States, of narrow-gauge lines, including rolling stock.

State.	Miles.	Cost per mile. inc. equip't.
Massachusetts	23.58	$26,214.92
New York	9.40	14,187.87
Pennsylvania	140.40	19,763.80
West Virginia	9.00	3,000.00
Ohio	81.72	10,343.91
Illinois	40.00	7,800.00
Wisconsin	31.00	15,244.18
Iowa	90.43	13,245.62
Kansas	56.00	16,885.67
Missouri	47.00	15,957.47
Utah	33.90	24,904.04
Colorado	276.00	47,596.00
South Carolina	49.50	10,101.00
Georgia	23.00	29,573.78
Alabama	5.50	18,151.50
Mississippi	26.00	22,857.15
Kentucky	11.00	9,090.90
Nevada	8.75	22,857.15
California	147.68	29,466.00
Washington Territory	32.00	45,625.00

It will be seen from the above table that narrow-gauge railroads vary in cost from $7,000 to $12,000 per mile in the level regions, and from $18,000 to $25,000 per mile in the more rough and tortuous countries.

Summed up as a whole, the experience gained by experiments in the past has placed the so-called "new style" road beyond a mere trial, and has proved that for communities whose traffic does not warrant an expenditure of from $40,000 to $50,000 per mile on a highway, and for opening up new districts, the narrow gauge is *the* road.

L. B. JACKSON, JR.

WHEELING, W. Va., July 15, 1878.

[It is difficult to speak with patience of any comparison so absurd as that above, the more so as it is exactly of the kind to which Baron von Weber's pamphlet calls attention—the comparison of things wholly unlike. The narrow-gauge roads are all, or all but one or two, light railroads, lightly equipped; the standard-gauge railroads are mostly heavy railroads, and many of them heavily equipped. Just as much may be inferred from a comparison of the Jamesville & Washington Railroad, of standard gauge, costing some $5,000 per mile, with the four-track line of the New York Central, as from a comparison of the average narrow-gauge road with the standard-gauge road—that is, just nothing at all. Thirty years ago nearly all the railroads in America were of 4 ft. 8½ in. gauge, or wider, and light and lightly equipped, and then their average cost was less than that of 3 ft. roads now. But we have never seen in this country a comparison made by a narrow-gauge advocate of a narrow-gauge road with standard-gauge roads of the same grade. The pretense that the difference between the average cost of the narrow-gauge roads and that of the standard-gauge roads in this country is a measure of a saving caused by the reduction of the gauge argues either gross ignorance or the intent to deceive.—EDITOR RAILROAD GAZETTE.]

First Iron Rails Made in the United States.

[From "Contributions to the History of Iron and Steel Manufacture in the United States," by James M. Swank, Secretary of the American Iron and Steel Association.]

The first iron rails of any kind that were made in this country were made of cast iron. Solomon W. Roberts gives us this information concerning them: "The Lehigh Coal and Navigation Company made a short section of experimental railroad in the summer of 1826, at its foundry at the upper end of the town of Mauch Chunk, and a car was run upon it. The idea then was to make a road of rails and chairs of cast iron, like those in use at the coal mines in the North of England. After casting a good many rails, each about 4 feet long, the plan was given up on account of its being too expensive."

Many years elapsed after the first railroad was built in this country before iron rails were made in American rolling mills. Among the proposals to furnish rails for the Columbia & Philadelphia Railroad, received in May, 1831, there were none for American iron, and the whole quantity was purchased in England. Previous to the passage of the tariff act of 1842 rails were admitted into this country virtually free of duty. On the passage of that act some American capitalists began to think about making our own rails.

A few flat rails had been rolled prior to 1842, but such rails were only bar iron. On the Mauch Chunk Railroad, built in 1827, the wooden stringers were strapped with common merchant bar iron, the flat bars being about one inch and a half wide and three-eighths of an inch thick. The holes for the spikes were drilled by hand. The flat rails which were afterward made differed from merchant bars of the same size only in this, that the rail in its last passage through the rolls became indented, or countersunk, at regular distances. The centre of the countersunk surface was afterward punched through for admitting the spike. As late as 1837, when the Erie & Kalamazoo Railroad was in course of construction from Toledo to Adrian, it was proposed to put down wooden rails of oak studding 4 in. square, and to draw the cars by horses. But wiser counsels prevailed, and by great exertions sufficient funds were obtained to enable the management to iron the road with flat rails five-eighths of an inch thick. Flat rails continued in use in this country, notwithstanding the introduction of heavier rails, down to about 1850. "It was not until 1850 that the longi-

tudinal sill and the flat rail were entirely removed from the Utica & Schenectady Railroad, the most important link in the New York Central line."

In 1844 the manufacture of heavy iron rails in this country was commenced at the Mount Savage Rolling Mill, in Allegheny County, Md., erected in 1843, especially for rolling these rails. The first rail rolled at the Mount Savage Rolling Mill, and for which the Franklin Institute of Philadelphia struck a silver medal, was a U rail, known in Wales as the Evans patent, of Dowlais Iron Works, Merthyr Tydvil. It was intended to be laid on a wooden longitudinal sill, and was fastened to it by an iron wedge, keying under the sill, thus doing away with outside fastenings. This rail weighed 42 ponds to the yard, and about 500 tons of it were laid, in 1844, on a part of the road then being built between Mount Savage and Cumberland, a distance of nine miles. It was understood at the time to be the first heavy railroad iron made in America.

The Montour Rolling Mill, at Danville, Pa., was built in 1845, expressly to roll rails, and here were rolled, in October of that year, the first T rails made in the country. The first T rail rolls made in this country were made for the Montour Iron Company by the firm of Haywood & Snider, proprietors of the Colliery Iron Works, at Pottsville, the work being done at their branch establishment at Danville. The Boston Iron Works were started in January, 1824, to manufacture cut nails, hoops and tack-plates, but they subsequently rolled rails, and on the 6th of May, 1846, they rolled the first T rails in Massachusetts, Ralph Crocker being superintendent. In 1845 the rolling mill of Cooper & Hewitt was built at Trenton, N. J., to roll heavy rails, and on the 19th of June, 1846, their first rail was rolled. About the 1st of September, 1846, the New England Iron Company, at Providence, R. I., commenced to roll T rails. The first lot of these rails rolled by the company was delivered to the Providence & Worcester Railroad, Sept. 11, 1846. T rails were rolled in November, 1846, at Phœnixville, Pa.; in the fall of the same year, at the Great Western Iron Works, at Brady's Bend, Pa.; early in 1847, at the Bay State Rolling Mill, in Massachusetts, then owned by the Massachusetts Iron Company; in January, 1848, at the Rough-and-Ready Rolling Mill, at Danville, Pa., and in the same year at Safe Harbor, Pa. All the T rails made at the mills above mentioned were rolled with a base or flange similar to that of the present T rail. A few other mills rolled heavy rails before 1850, but at the beginning of that year, owing to low duties, only two out of fifteen rail mills in the country were in operation. It has been claimed that heavy rails in this country were first made at Brady's Bend; but this is a mistake, as the dates above fully show. The mill at this place was built in 1841, as a merchant bar mill, and any rails that it may have made prior to the fall of 1846 were flat rails. The first shipment of T rails made by the company was in June, 1847, by keel-boat on the Allegheny River to Pittsburg.

The first T rails imported into this country were made to be fitted into cast-iron chairs, resting upon square stone blocks, but in a few years wooden cross-ties were used instead of the blocks. On the Boston & Lowell Railroad, which was completed in 1835, stone cross-ties were at first laid, some of which were in use as late as 1852. A thin wedge or key of wrought iron was driven between the inside of the chair and the rail to keep the latter firmly in its place, and the operation of "driving keys" had to be repeated almost every day, owing to the tendency of moving trains to loosen them. Rails of this pattern were used for many years upon the Allegheny Portage Railroad in Pennsylvania, and many of the stone blocks can now be seen in its abandoned bed. A writer on railroads in "Johnson's Cyclopedia, states that the first T rails introduced into this country were laid on the New Orleans & Pontchartrain Railroad in 1831. Assuming that the statement is correct, the pattern used was undoubtedly that which we have just described. Rails made with the broad base now found in all T rails are said to have been first made in England about 1836, for the Camden & Amboy Railroad of New Jersey, and the innovation is said to have been the result of a futile effort to roll a rail and chair in one piece. In a notice of Robert Livingston Stevens, in the "American Cyclopedia," it is stated that "in 1836 he introduced the T rail on the Camden & Amboy Railroad, of which he was President for many years." The reference here is doubtless to the present form of the T rail. It seems strange that this form of rail should not have become generally popular in this country until many years after 1836.

The first 30-foot rail rolled in this country is claimed to have been rolled at the Cambria Iron Works, at Johnstown, Pa., in 1855. These rails were perfectly made, but there being no demand for them they were used in the company's tracks. It is claimed that the first 30-foot rails rolled in this country on order were rolled at the Moutour Rolling Mill, in January, 1859, for the Sunbury & Erie Railroad Company.

It is worthy of notice that in 1876 one rolling mill in Pennsylvania, the Cambria Iron Works, rolled the largest aggregate of rails ever rolled in one year by one mill in this country. Its production of rails in that year was 103,743 net tons, of which 47,643 tons were iron rails and 56,100 tons were steel rails. Beginning business in 1853, it has since manufactured one-tenth of the total product of American rails.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Portsmouth, Great Falls & Conway, special meeting in Portsmouth, N. J., July 30, at 11 a. m. The meeting is called to consider the question of putting the company into bankruptcy.

Rutland, annual meeting at the office in Rutland, Vt., July 31, at 2 p. m.

Dividends.

Dividends have been declared as follows:

Burlington & Missouri River in Nebraska, 2 per cent., payable Aug. 1. This is the company's first dividend.

Mobile & Montgomery, 2½ per cent., semi-annual, payable July 31.

Foreclosure Sales.

The *Lake View & Collamer* road was sold in Cleveland, O., July 17, and bought by Wm. E. Lewis for $500, subject to a first mortgage for $25,000. It is a light suburban road, from Cleveland to Euclid, about eight miles.

Future sales are announced as follows:

The *Montclair & Greenwood Lake* road will be sold in Jersey City, N. J., Aug. 17, by Wm. Patterson, Master, under a decree of foreclosure granted by the Court of Chancery of New Jersey, at the suit of George Walker and Amzi Dodd, trustees. The foreclosure is of the first mortgage for $700,000; there is also a second mortgage for $1,800,000. The road is about 40 miles long, from West End Junction, N. J., to Cooper, and a branch from Montclair to Caldwell is partly graded. It was originally the Montclair Railroad, was sold under successive foreclosures of the old second and first mortgages and reorganized under the present name in 1876. The present second-mortgage bonds represent the original firsts, and the present stock the original second-mortgage bonds.

General Freight Agents' Association of New England.

The regular semi-annual meeting of this Association was held in Springfield, Mass., July 17. Twenty-three members were present. The only business besides the usual routine proceedings was the appointment of a committee to prepare a scheme for the uniform classification of freight, to be presented at the winter meeting, which will be held in Boston in January. The meeting closed with a dinner at the Massasoit House, and an excursion to Mount Holyoke.

ELECTIONS AND APPOINTMENTS.

Baltimore & Delta.—This company, as consolidated, was organized at Belair, Md., July 20, by the election of the following directors: Thomas Armstrong, Charles W. Hatter, Baltimore; Ex-Gov. Bradford, Philip T. George, Wm. Gilmor, James L. Sutton, Baltimore County, Md.; Stevenson Archer, Caleb J. Moore, E. S. Rogers, James P. Street, Eli Tucker, W. H. Waters, Harford county, Md.; Foulke Jones, York County, Pa. The board elected W. H. Waters, President.

Baltimore & Hanover.—Mr. Joseph G. Gitt, of New Oxford, Pa., has been appointed Chief Engineer, in place of Mr. Taylor, resigned.

Chicago, Burlington & Quincy.—The headquarters of Mr. F. H. Tubbs, Superintendent of Telegraph, have been removed from Chicago to Burlington, Ia.

Dannemora.—Mr. George Miner has been appointed Superintendent of this new road, with headquarters at Plattsburg, N. Y. He was recently a conductor on the New York Central.

Denver, South Park & Pacific.—Mr. J. W. Nesmith has been appointed General Superintendent. He was recently Master Mechanic of the Denver Division, Kansas Pacific.

Eastern.—Mr. Charles S. Sergeant has been appointed Auditor, and has charge of all the accounts of the company.

Eastern, in New Hampshire.—At the adjourned annual meeting in Portsmouth, July 18 the following directors were chosen: Moody Currier, Walter Hastings, Dexter Richards, Francis Thompson, Thomas J. Lee, Edward A. Abbott, Edward L. Giddings. The board elected Moody Currier President; Wm. H. Y. Hackett, Clerk; Thomas J. Lee, Treasurer.

Hudson River Tunnel.—Col. Wm. H. Payne is Chief Engineer. He is also Assistant Engineer on the East River Bridge.

There are two companies organized under this name, one in New York having as directors De Witt C. Haskins, T. W. Park, L. C. Fowler, Wm. Martin, A. B. Gibbs, J. C. Tucker and C. Goddard. The New Jersey corporation has as directors De Witt C. Haskins, Theo. F. Wood, L. C. Fowler, T. W. Park, C. Goddard, George Miller, William M. Force, L. M. Price, James L. Marvin, James S. Wetheral, J. C. Tucker and A. B. Gibbs.

Marquette, Houghton & Ontonagon.—At the annual meeting in Marquette, Mich., July 18, the following directors were chosen: Samuel Schoch, Marquette, Mich.; George Jerome, Detroit, Mich.; John Bloodgood, Edwin F. Hatfield, Jr., Roswell G. Rolston, Samuel Sloan, John Stewart, Moses Taylor, New York; Alexander Agassiz, Henry L. Higginson, Richard T. Fay, Boston. The new directors are Messrs. Agassiz and Fay, who succeed Charles H. Palmer and S. L. Smith.

Northern & Southern West Virginia.—At the annual meeting recently the following directors were chosen: Benjamin W. Byrnes, Charleston, W. Va.; Gideon D. Camden, Clarksburg, W. Va.; John W. Strong, Detroit, Mich.; Abram M. Gentry, W. B. Hotchkiss, Wm. Montrose, Willard Parker, Jr., James B. Weir, Oliver E. Wood, New York.

Philadelphia & Reading.—Mr. J. H. Olhausen, Superintendent of the Mahanoy & Shamokin Division, has been appointed also Superintendent of the Schuylkill Valley, Mount Carbon & Pottsville, Mahanoy & Broad Mountain and Mine Hill divisions, in place of W. C. Wheeler, resigned.

Raleigh & Augusta Air Line.—At the annual meeting in Raleigh, N. C., July 18, the old board was reëlected, as follows: Joseph B. Batchelor, Walter Clark, Raleigh, N. C.; Dr. W. J. Hawkins, Ridgway, N. C.; Paul C. Cameron, Hillsboro, N. C.; W. W. Chamberlaine, Norfolk, Va.; John M. Robinson, Baltimore; Lewin W. Barringer, Philadelphia. The board reëlected John M. Robinson President; W. W. Vass, Secretary and Treasurer; John C. Winder, General Superintendent.

Raleigh & Gaston.—At the annual meeting in Raleigh, N. C., July 18, John M. Robinson was reëlected President, with the old directors, as follows: Joseph B. Batchelor, Walter Clark, Raleigh, N. C.; Dr. W. J. Hawkins, Ridgway, N. C.; Paul C. Cameron, Hillsboro, N. C.; W. W. Chamberlaine, Norfolk, Va.; Lewin W. Barringer, Philadelphia. The board reëlected W. W. Vass, Secretary and Treasurer; John C. Winder, General Superintendent. Major Vass begins his 35th year's service as an officer of the company.

Texas Western.—Col. J. G. Tracy, of Houston, Tex., has been appointed Receiver, on application of the Farmers' Loan & Trust Company, Trustee.

Vermont & Boston Telegraph.—At the annual meeting at White River Junction, Vt., July 24, the following directors were chosen: Norvin Green, C. Livingston, W. S. Hunt, O. S. Palmer, John C. Hinchman, Charles F. Wood, G. W. Gates, R. H. Rochester, H. C. Sherman. The board elected Dr. Norvin Green President; R. H. Rochester, Secretary and Treasurer.

PERSONAL.

—The Springfield *Republican* says: "Chief Engineer Granger of the Hoosac Tunnel Line has resigned his position, it is said, to work on Gen. Burt's new railroad."

—Mr. Henry Pratt has resigned his position as General Ticket Agent of the Wisconsin Central. It is said he has been offered a position on one of the Vanderbilt roads. He was for some time Mr. E. P. Phillips' private secretary on the Michigan Southern, and is approved as a faithful and intelligent official.

—Mr. George Williams, a large contractor and a prominent citizen, died suddenly in Keokuk, Ia., July 18. He was at one time Superintendent of the old Logansport & Bur-

RAILROAD EARNINGS IN JUNE.

Name of Road.	Mileage. 1878.	1877.	Inc.	Dec.	Per c.	Earnings. 1878.	1877.	Increase.	Decrease.	Per c.	Earnings per Mile. 1878.	1877.
Atchison, Topeka & Santa Fe	786	711	75	.....	10.5	$251,000	$185,731	$65,269	.....	35.1	$319	$261
Burl'gton, Ced. Rapids & North.	434	368	66	.....	17.9	101,014	69,357	31,657	.....	45.6	233	188
Cairo & St. Louis	146	146	.....	.....	.....	18,160	19,984	.....	1,824	9.1	124	137
Central Pacific	1,878	1,818	60	.....	3.3	1,460,000	1,484,232	.....	24,232	1.6	777	816
Chicago & Alton	678	678	.....	.....	.....	349,502	358,982	.....	9,480	2.6	515	529
Chicago, Milwaukee & St. Paul.	1,470	1,402	68	.....	4.9	636,000	588,223	47,777	.....	8.0	433	420
Cleveland, Mt. Vernon & Del.	157	157	.....	.....	.....	28,295	35,196	.....	6,901	19 6	180	224
Denver & Rio Grande	304	269	35	.....	13.0	89,435	57,502	31,933	.....	55.5	294	214
Illinois Central, Illinois lines	819	707	112	.....	.....	421,090	386,905	34,185	.....	8.8	513	547
" " Iowa lines	402	402	.....	.....	15.8	115,020	95,257	19,763	.....	20.7	286	232
Indianapolis, Bl'm'gton & West.	343	343	.....	.....	.....	84,068	85,090	.....	1,022	1.2	245	248
International & Great Northern	516	516	.....	.....	.....	72,130	75,134	.....	3,004	4.0	140	146
Kansas Pacific	673	673	.....	.....	.....	223,523	253,652	.....	30,129	11.9	332	377
Missouri, Kansas & Texas	786	786	.....	.....	.....	207,514	258,123	.....	50,609	19.6	264	328
Paducah & Memphis	115	115	.....	.....	.....	14,329	12,611	1,718	.....	13.6	125	110
St. Louis, Alton & Terre Haute, Belleville Line	71	71	.....	.....	.....	38,548	35,079	3,469	.....	9.9	543	494
St. Louis, Iron Mt. & Southern	685	685	.....	.....	.....	253,600	274,164	.....	20,564	7.5	370	400
St. Louis, Kansas City & North'n	530	530	.....	.....	.....	205,733	171,856	33,877	.....	19.7	388	324
St. Louis & Southeastern	354	354	.....	.....	.....	86,909	78,818	8,091	.....	11.3	246	223
Toledo, Peoria & Warsaw	237	237	.....	.....	.....	76,887	80,010	.....	3,123	3.9	324	338
Wabash	688	680	8	.....	1.2	322,801	353,847	.....	31,046	8.8	469	520
Totals	12,072	11,648	424	.....	.....	$5,055,558	$4,959,753	$277,739	$181,934	.....	$419	$426
Total increase	.....	.....	424	.....	3.6	.....	.....	95,805	.....	1.9	.....	.....

RAILROAD EARNINGS, SIX MONTHS ENDING JUNE 30.

Name of Road.	Mileage. 1878.	1877.	Inc	Dec	P. c.	Earnings. 1878.	1877.	Increase.	Decrease.	P. c.	Earnings Per Mile. 1878.	1877.	Inc.	Dec.	P. c.
Atchison, Top. & S. Fe	786	711	75	....	10.5	$1,498,382	$1,036,671	$461,711	.....	44.5	$1,906	$1,458	$448	.....	30.7
Burlington, Ced. Rapids & Northern	426	368	58	....	15.7	793,531	428,649	364,882	.....	85.1	1,863	1,165	698	.....	59.1
Cairo & St. Louis	146	146	....	....	....	103,357	123,741	.....	$20,384	16.5	708	848	.....	$140	16.5
Central Pacific	1,878	1,686	192	....	11.4	7,883,363	7,838,705	44,658	.....	0.6	4,198	4,649	.....	451	9.7
Chicago & Alton	678	678	..	....	....	1,993,941	2,031,742	.....	37,801	1.9	2,941	2,997	.....	56	1.9
Chicago, Mil. & St. Paul.	1,422	1,402	20	....	1.4	4,257,000	2,958,152	1,298,848	.....	43.9	2,994	2,110	884	.....	42.1
Cleveland, Mt. V. & Del.	157	157	....	....	....	179,126	184,660	.....	5,534	3.0	1,141	1 176	....	35	3.0
Denver & Rio Grande	304	269	35	....	13.0	436,705	306,137	130,568	.....	42.7	1,437	1,138	299	.....	26.3
Grand Trunk	1,390	1,389	1	....	0.1	4,350,177	4,326,907	23,270	.....	0.5	3,130	3,115	15	.....	0.5
Great West. of Canada	511	511	....	....	....	2,201,600	1,994,832	206,768	.....	10.4	4,308	3,904	404	.....	10.1
Illinois Cen., Ill. lines	819	707	112	....	15.8	2,540,042	2,174,750	365,292	.....	16.8	3,101	3,076	25	.....	0.8
" Iowa lines	402	402	....	....	....	748,766	599,373	149,393	.....	24.9	1,863	1,491	372	.....	24.9
Ind., Bloom. & Western	343	343	....	....	....	614,307	579,396	34,911	.....	6.0	1,791	1,689	102	.....	6.0
International & Gt. Nor.	516	516	....	....	....	582,678	659,727	.....	77,049	11.7	1,129	1,279	.....	159	11.7
Kansas Pacific	673	673	....	....	....	1,435,975	1,346,045	89,930	.....	6.7	2,134	2,000	134	.....	6.7
Missouri, Kan. & Tex.	786	786	....	....	....	1,255,760	1,430,933	.....	175,173	12.2	1,598	1,821	.....	223	12.2
Paducah & Memphis	115	115	....	....	....	100,397	86,310	14,087	.....	16.3	873	757	122	.....	16.3
St. Louis, Alton & T. H. Belleville Line	71	71	....	....	....	223,263	238,491	.....	15,228	6.4	3,145	3,350	.....	214	6.4
St. Louis, Iron Mt. & So.	685	685	....	....	....	1,868,068	1,932,141	.....	64,073	3.3	2,727	2,821	.....	94	3.3
St. Louis, K. C. & Nor.	530	530	....	....	....	1,510,098	1 411,222	98,874	.....	7.0	2,850	2,663	187	.....	7.0
St. Louis & Southeast'n	354	354	....	....	....	529,250	487,080	42,170	.....	8.7	1,495	1,376	119	.....	8.7
Toledo, Peoria & War.	237	237	....	....	....	613,042	498,503	114,539	.....	23.0	2,587	2,103	484	.....	23.0
Wabash	688	654	34	....	5.2	2,216,081	2,059,070	157,611	.....	7.7	3,222	3,148	74	.....	2.4
Totals	12,917	13,390	527	....	....	$37,935,507	$34,733,237	$3,597,512	$395,242	....	$2,735	$2,594	$131	.....	5.1
Total increase	.....	.....	527	....	3.9	.....	.....	3,202,270	.....	9.2	.....	.....	.....	.....	.....

lington road, and was also connected for a time with the Des Moines Valley road. He had done a good deal of work for the Government on river improvements.

—Mr. Charles Sellers, Master Mechanic of the St. Louis, Keokuk & Northwestern road, was accidentally killed at Keokuk, Ia., July 17. He was standing on the platform of a passenger car, which was being run on a siding near the shops, when he fell or was thrown off, and was caught between the body of the car and a coal chute. He was terribly crushed and mangled, and was killed instantly.

—Mr. W. A. H. Loveland, President of the Colorado Central Company, was last week nominated as a candidate for Governor of Colorado by the Democratic State Convention.

—Mr. George M. Tibbitts, an old and wealthy merchant of Troy, N. Y., died in that city, July 19, aged 82 years. He was a director of the Saratoga & Schenectady Company.

—Hon. John A. Lott, recently President of the Brooklyn, Flatbush & Coney Island Company, died very suddenly, July 20, at his residence in Flatbush, N. Y., aged 73 years. He had been a prominent lawyer for many years and had held several public offices, serving in the State Legislature and as Judge of the Supreme Court and the Court of Appeals.

—It is reported that Mr. C. F. Morse, General Superintendent of the Atchison, Topeka & Santa Fe, has resigned, and that the position has been offered to Mr. A. E. Touzalin, now Land Commissioner of the Burlington & Missouri River in Nebraska. Mr. Touzalin seems to be in demand, for, if reports are to be believed, he has had his choice recently of four or five important offices.

—Mr. Albert Fink, Commissioner of the Trunk Lines, sailed last Wednesday on the St. Laurent for France, intends to be absent about two months, for rest and recreation.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending March 31:	1877-8.	1876-7.	Inc. or Dec.	P. c.
Hanover Junction, Hanover & Gettysburg	$97,733	.....	.....	....
Expenses	43,873	.....	.....	....
Net earnings	$53,860	.....	.....	....
Earnings per mile	3,258	.....	.....	....
P. c. of expenses	44.91	.....	.....	....
Year ending May 31:				
Raleigh & Gaston	$242,478	$234,511	I. $7,967	3.4
Expenses	135,293	148,761	D. 13,468	9.1
Net earnings	$107,185	$85,750	I. $21,435	25.0
Earn. per mile	2,500	2,418	I. 82	3.4
Per cent. of exps	55.79	63.43	D. 7.64	12.0
Six Months ending June 30:	1878.	1877.		
Pittsburgh, Cin. & St. Louis	$1,511,438	.....	.....	....
Net earnings	519,581	.....	.....	....
P. c. of expenses	65.64	.....	.....	....
St. Louis & Southeastern	530,704	$487,505	I. $43,199	8.9
Net earnings	104,213	77,623	I. 26,590	34.3
P. c. of expenses	80.47	84.80	D. 4.33	5.1
Five Months ending May 31:				
Grand Trunk	£750,263	£736,074	I. £14,189	1.9
Net earnings	167,466	154,291	I. 13,175	8.5
P. c. of expenses	77.71	79.05	D. 1.34	1.7
Second week in July:				
Denver & Rio Gr.	$28,289	$18,001	I. $10,288	57.2
Week ending July 13:				
Grand Trunk	$143,749	$168,261	D. $24,512	14.6

Pittsburgh Iron Receipts,

Receipts of iron and ore at Pittsburgh for the six month ending June 30 were, in tons:

	1878.	1877.	Inc. or Dec.	P.c.
Pig iron	124,351	139,555	D. 15,204	10.9
Scrap iron	31,923	34,688	D. 2,765	8.0
Blooms and billets	13,823	5,864	I. 7,959	135.7
Cinder and muck-bar	18,344	5,959	I. 12,385	207.8
Iron ore	126,068	111,116	I. 14,952	13.5
Totals	314,509	297,182	I. 17,327	5.8

Of the tonnage this year 91,956 tons came by the Pittsburgh, Fort Wayne & Chicago; 78,408 by the Cleveland & Pittsburgh; 63,096 by the Pennsylvania; 43,791 by the Ohio River, the rest by the other roads. The heaviest receipts of ore—69,324 tons—were by the Cleveland & Pittsburgh.

Grain Movement.

For the week ending July 13 receipts and shipments of grain of all kinds, in bushels, have been reported as follows for the past five years:

Receipts of the eight leading Northwestern markets.

1878.	1877.	1876.	1875.	1874.
3,118,902	2,550,086	2,028,445	3,112,134	3,082,391

The total shipments of these same markets were:

1878.	1877.	1876.	1875.	1874.
2,967,635	3,341,924	2,877,186	3,418,258	3,205,311

Of the above shipments the number of bushels and the percentage of the total shipped by rail were:

1878.	1877.	1876.	1875.	1874.
922,931	669,103	1,228,678	1,173,995	276,288
31.1 p.c.	20.0 p. c.	42.7 p. c.	34.4 p. c.	8.6 p. c.

The receipts at the seven Atlantic ports for the week were:

1878.	1877.	1876.	1875.	1874.
2,907,445	2,229,164	4,873,451	2,418,673	3,531,237

Of these latter receipts this year, 51.6 per cent. were at New York, 17.9 at Baltimore, 15.2 at Boston, 7.3 at Philadelphia, 6 at Montreal, 1.1 at New Orleans and 0.9 per cent. at Portland.

Coal Movement.

Coal tonnages for the week ending July 13 are reported as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite	298,749	456,750	D. 158,001	34.6
Semi-bituminous	75,737	53,676	I. 22,061	41.1
Bituminous, Pennsylv'a.	24,081	.....	.....	....

The tonnage actually passing over the Pennsylvania & New York road for the seven months of its fiscal year from Dec. 1 to June 29 was as follows:

	1878.	1877.	Decrease.	P. c.
Anthracite	375,912	486,287	110,375	22.7
Bituminous	180,951	195,988	15,037	7.7
Total	556,863	682,275	125,412	18.4

The coal tonnage of the Pennsylvania Railrodd for the six months ending June 30 was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite	314,453	322,906	D. 8,453	2.6
Semi-bituminous	747,340	770,251	D. 22,911	3.0
Bituminous	801,708	805,786	D. 4,078	0.5
Coke	507,487	398,275	I. 109,212	27.4
Total	2,370,988	2,297,218	I. 73,770	3.2

Coal shipments from Seattle, Wash. Ter., for June were 8,968 tons. For the six months ending June 30 they were: 1878, 47,395; 1877, 58,798; decrease, 11,403 tons, or 19.4 per cent.

At the regular monthly meeting of the Anthracite Board of Control in Philadelphia, July 23, the production for August was fixed at 2,000,000 tons, apportioned as follows: Philadelphia & Reading, 572,500; Lehigh Valley, 395,000; Central of New Jersey, 258,100; Delaware, Lackawanna & Western, 255,000; Delaware & Hudson Canal, 249,600; Pennsylvania Railroad, 152,500; Pennsylvania Coal Company, 117,300. An advance in prices was discussed, but no definite action taken.

Petroleum Movement.

The production of the Pennsylvania oil wells for June is given by *Stowell's Petroleum Reporter* as follows:

	1878.	1877.	Inc. or Dec.	P.c
Total production	1,217,250	1,130,790	I. 86,460	7.6
Shipments	1,135,119	1,391,124	D. 256,005	18.4
Stock, June 30	5,078,189	2,912,674	I. 2,165,515	74.3

Shipments of refined from Pittsburgh for June were: East by Pennsylvania Railroad, 87,779 barrels: east by Baltimore & Ohio, 13,935 barrels; west, 756 barrels; total, 102,470 barrels.

Iron Ore Movement.

Shipments of iron ore from the Lake Superior Region up to July 3 were as follows, in tons:

	1878.	1877.	Inc. or Dec.	P.c.
Escanaba	165,273	154,444	I. 10,829	7.0
Marquette	202,198	182,336	I. 19,862	10.9
L'Anse	14,276	24,885	D. 10,609	42.6
Total	381,747	361,665	I. 20,082	5.6

Shipments of pig iron for the same period were 2,288 tons.

RAILROAD LAW.

Garnisheeing a Railroad Company for Cars of Other Roads.

In the case of the Michigan Central garnishee, against the Chicago & Michigan Lake Shore, the Illinois Appellate Court at Chicago last week held that the State attachment and garnishment acts, although broad enough to cover as garnishee all persons having any property, effects or real estate of the debtor in their custody, yet numerous cases decided that in many instances these statutes did not apply. Various considerations of public policy went to show that a much narrower application was intended. Although a railroad company was a private corporation, still, as it was a common carrier, it exercised a public employment, and was bound to receive and transport all freight offered. The same consideration of public policy ought to exempt a railroad company as would exempt other public officers and agents in the discharge of their official duties. If not, the present method of carrying freight, which greatly subserved the public interest, must be seriously interfered with to serve private ends. If not, each railroad company would be made an agency for collecting the debts of all connecting railroads, and the present system would have to be abandoned. On the basis of public policy, therefore, it must be held that the cars of one company in the hands of another were not liable to garnishment.

Liability for a Defective Platform.

In Clussman against the Long Island Company the plaintiff was injured while going from the defendant's car over one of their station platforms to send a telegram from an office in the station. He recovered damages and the case was taken to the Supreme Court, which held as follows:

"The proposition which is now designated to be stated is this, namely: That a railroad company having a telegraph in one of its stations, open to the public, is responsible to one of its passengers who is injured through their negligence alone while going to it over their structure or platform by which it is made accessible. And it follows that the passenger is not to be prevented from a recovery, save where he has by some act of his contributed to the injury received. In this case there was no negligence on the part of the plaintiff; but the benefit of such an element, if it existed, was given to the jury by the charge. The judgment should therefore be affirmed. The law as expounded is in harmony with the principles of natural justice and equity, and should prevail. The damages were not excessive."

The case was then taken up to the Court of Appeals, which has now finally affirmed the decision.

Pre-empting Railroad Lands.

In the case of Dudemott against the Kansas Pacific, the Secretary of the Interior has reversed the decision of the General Land Office, and holds that, under the charter and land grant of the company, its lands are open to pre-emption at $1.25 per acre. The act of Congress provided that all lands granted to the company which should remain unsold three years after the completion of the road should be open to pre-emption, and the Secretary now decides that it is in force. A similar clause in the Union Pacific land grant makes it subject to the decision. The decision, however, is liable to be reviewed by the courts.

THE SCRAP HEAP.

Railroad Manufactures.

The *Iron Age* reports the condition of the blast furnaces of the United States on July 1 as follows:

	In blast.	Out of blast.	Not reported.	Total.
Charcoal	64	202	3	269
Bitumin's or coke	89	128	..	217
Anthracite	95	130	..	225
Total	248	460	3	711
Capacity pr. week, tons	46,470	67,987	..	114,457

The number of furnaces in blast was 34.9 per cent. of the whole, but their productive capacity was 40.6 per cent. of the total, indicating that the larger furnaces are best able to keep at work under the present low prices.

The Patten Car Works, at Bath, Me., recently completed two passenger, one smoking and baggage and some freight cars for the Rumford Falls & Buckfield road.

The Schenectady (N. Y.) Locomotive Works have just sent three first-class engines, 17 by 24 in. cylinders, to the Central Pacific Railroad, and are working on an order of nine for the Chicago, Milwaukee & St. Paul Railway; also have an order from the Chicago & Alton Railroad and have other work on hand. These works turned out 50 first-class locomotives last year for the New York Central & Hudson River Railroad Company.

The Carbon-Bronze Co, at Pittsburgh, has a number of orders on hand, including several from railroads for journal boxes.

The Erie (Pa.) Car Works are building 100 box cars for the Chicago, Rock Island & Pacific.

The Chicago Car Wheel Works are turning out an average of 60 car wheels per day.

The Joliet (Ill.) Iron & Steel Works are still busy on their heavy contract for steel rails for the Chicago & Alton's Kansas City Extension.

The iron works of Arms, Bell & Co., at Youngstown, O., have stopped for the purpose of putting in a new engine and repairing the boilers.

At the annual meeting of the North Chicago Rolling Mill Co., in Chicago, July 15, O. W. Potter was chosen President; O. P. Burt, Vice-President; R. C. Hannah, Secretary; S. Clement, Treasurer. The gross earnings for the past year were reported as $3,226,518; total surplus July 1, $831,547. The total product for the year was 1,113,594 tons of iron and steel; present capacity of mill, 1,000 tons per day. The works at Chicago and Milwaukee are in full operation, employing 3,000 men.

Jesse Starr & Son, of the Camden (N. J.) Iron Works, have gone into bankruptcy, with liabilities of $300,000. The assets are much larger in value, but consist of real estate, machinery and similar property, which may not bring anything like its value at a forced sale. The works are very extensive, employing nearly 1,000 men, and making gas and water pipes, iron tubes and similar work.

The Riverside Iron Works, at Wheeling, W. Va., have the contract to furnish the rails for 25 miles of the Bellaire & Southwestern road. They are to be 30 lbs. to the yard.

The steel mill of the Lackawanna Iron & Coal Co., at Scranton, Pa., last week made, in spite of the extreme heat of the weather, 2,112 tons of ingots, which is believed to be the largest week's work ever done with two converters.

Bridge Notes.

The new Morse Bridge Works, at Youngstown, O., have shipped three bridges, and have orders enough on hand to keep them running for several months.

Notes.

Out in Western Massachusetts station agents exercise their wits in providing for passengers who have to wait at the station. One man has supplied a croquet set, which meets with much favor. Another believes that the traveler needs rest rather than amusement, and has hung a hammock under an adjoining shed. Both have set good examples, for a long wait at a country depot is about as tedious as anything that can be thought of.

An Illinois man, with a foresight worthy of a better cause, popped the question on a railroad train, and now the maiden is at a loss to decide as to which county she had better commence proceedings in for a breach of promise.—*Cincinnati Breakfast Table.*

Government Contracts.

Major Wm. P. Craighill, United States Engineers, will receive proposals at his office in Baltimore as follows:

Until Aug. 8 for dredging in the Wicomico River, near Salisbury, Md.

Until Aug. 5 for dredging in the Patapsco River, near Baltimore.

Until Aug. 5 for continuing work on the closing of New Inlet, Cape Fear River, near Wilmington, N. C.

Until Aug. 6 for widening the Dutch Gap Cut-off in James River, Va.

Specifications, forms of bid, etc., can be obtained at the office in Baltimore.

A Bird's Nest in a Car.

The Burlington (Vt.) *Free Press* says: "In the chimney of one of the cars of the Burlington & Lamoille Railroad is a bird's nest, containing two eggs. The car leaves Cambridge Junction on its daily trips at noon, and gets back again at 6:30, and during that time the mother-bird remains at the Junction, going to the nest as soon as the car arrives there. What she will do when it comes to hatching time remains to be seen."

A Railroad Transfer Explained.

Can this be the reason the Michigan Central was bought, and the manner in which the stock was increased? Report says that a thrilling incident occurred the other day in Jackson, the world-renowned point for quick locomotive building. The Jackson *Patriot* of June 26 casually mentions that Mr. Vanderbilt remained only half an hour to look over Mr. Edgerley's shops—but imagine the astonishment of the railway king when, as he was about making his exit from the front door, he was touched upon the shoulder by one of the workmen, down whose face the perspiration was pouring like a torrent.

"What do you want, sir?" inquired Mr. V.

"Only remain five minutes—just five minutes, sir!" pleaded the half-drowned man.

"And for what purpose, pray, sir?" was the quick but courteous rejoinder.

"Well, sir, when you entered these shops it was the signal to commence building a 40-ton locomotive, and we desire to complete it in time to take you West, sir. Only five minutes more, your honor, and the critter'll be finished."

Mr. V. assured the workman that it was quite impossible for him to remain longer—but remarked:

"From reports I read in the London *Times* while in Europe concerning this shop, I am satisfied that it can be done"—and dropping his voice almost to a whisper, he added confidentially, "and that's the reason I gobbled the road, Sam."

Bidding all hands good-bye, he left on his 60-mile an hour train for the West—but the workmen observing the disappointment of one of the bosses, dropped into line for renewed exertion, and in just 32½ seconds had the iron monster out and ready for use. The derrick of the wrecking car hoisted aboard of her a favorite two-ton engineer, and away she sped like a thunderbolt, overtaking Mr. V. a few miles west of Jackson. One of the boys stepped from the front of the engine to the platform of the rear car and informed Mr. V. that the engine which had been commenced on his entering the shop was now at his back door carrying 400 pounds of steam to the inch as a test. He begged pardon for the intrusion, but thought, being so near, he might as well step in and inform him that the machine was ready.

Mr. V. extended his left hand familiarly, and simply said, "Shake, Sam!" at the same time dropping a dime into his palm for the purpose of moistening his whistle. Then as the happy mechanic returned to his engine, the great magnate turned to his Secretary with a look of infinite gratification, and instructed him to mark Michigan Central stock up ten cents!"—*Aurora (Ill.) Beacon.*

Tramps.

A female tramp took a perilous ride on conductor Henry Harris' freight train on the Chattanooga Railroad, not long since. No box car was open to enable her to steal a ride, so she mounted a ladder between the cars, and, while she stood with one foot on one round, she held to another with her hands. She got on at Decherd and intended riding over Cumberland Mountain. Just before reaching Cowan, however, Harris saw something flapping out between the cars and wondered what it could be, for he had not before observed it. When the train stopped, he went back and discovered that the habiliments with which the wind had been playing, were those of a woman. He helped her down, and asked her if she did not know that she had occupied a most dangerous position. She said she could not help it; she had determined to go over the mountain and did not intend to

walk. He told her that she could not go over on a freight train, and she would have to stop over at Cowan. About this time a big, lubberly fellow came out from between two other cars and confessed to be the woman's companion. "And were you the person who instigated this woman to take this perilous ride?" asked Harris, as he grew "red hot" at the thought. "Yes," said the man, "because, if she had not rode there, you might have seen her and put her off." That was too much for Harris, and he told the tramp if he didn't move instanter he would boot him. Not wishing to come into rude contact with a No. 9 box-toe, the tramp left in haste, followed by the woman.—*Nashville (Tenn.) American.*

The tramp is not entirely confined to the Western States. On July 13 a gang of armed tramps, reinforced by some local roughs, boarded a New Haven & Northampton excursion at Cheshire, Conn., and took full possession, the trainmen and unarmed passengers being unable to put them down. They uncoupled cars, robbed some persons, insulted and maltreated others and finally left the train before they reached a town where the local police would be strong enough to deal with them. In one car, however, some men rallied and pitched the aggressors through a window.

Permissible Curves and Grades in Germany.

Under date of June 12 Prince Bismarck has issued a set of standard regulations for the construction and equipment of railroads in the German Empire. In these it is declared that the sharpest curve on the open road (that is, between stations on main track) may be of not less than 590 feet (180 meters) radius; and the use of curves of less than 985 ft. (300 meters) radius requires special permission from the Imperial Railroad Bureau. By the same regulations there must be no steeper grade than 132 ft. per mile, and special permission is required for one of more than 66 ft. per mile.

Sizes of Axles in Germany.

The regulations recently issued by the German Empire, prescribe that the diameter of axles under passenger cars shall not be less than 4½ in. (0.115 meter). The sizes of axles and journals for other cars shall be, in proportion to the weight on them, if of best iron:

	Diameter	
	In wheel seat.	In journal.
Load of 8,360 lbs.	4.00 in.	2.60 in.
" 12,100 "	4.50 "	3.00 "
" 17,600 "	5.20 "	3.40 "
" 22,000 "	5.60 "	3.80 "

The length of journal must be 1¾ to 2¼ times its diameter. If cast steel is used, the loads on these diameters may be increased one-fifth.

An American freight car, limited to a load of 13 tons, and weighing itself 10 tons, would have to bear a maximum weight of 11,500 lbs. per axle, and so by these regulations would not be permitted to have journals smaller than 3 in. × 5½ in.

A Mechanical Track Inspector.

A German engineer, Dorpmüller, has invented an apparatus which, when run over a railroad track, records automatically on a strip of paper, with regard to the track: 1, every increase and decrease in the width of the gauge, of its actual size; 2, the point where changes in the width of gauge begin and end; 3, whether in passing from a straight line to a curve the gauge is gradually widened, and how much this widening is; 4, whether the gauge is constantly increased, and how much. With regard to surface: 1, every difference in height of the two opposite rails, one-third of the actual size; 2, every change in this height, or whether first one and then the other line of rails is highest; 3, whether in passing from a straight line to a curve the superelevation is always found, and within what distance; 4, whether the superelevation on curves is always the same or varies.

Besides these results many defects in the track are brought to light by the diagram, such as crooked rails on a tangent, flattened rails, rail heads that do not match, etc. Deflections in the line at short intervals indicate a badly tamped track, and badly spiked rails are also brought to notice. The apparatus has been in use more than a year on a leading German road and is said to have proved practical and reliable.

Performance of a "Mogul" Locomotive on a grade of 83 feet per mile, combined with 2° curve.

The proprietors of the Baldwin Locomotive Works have published in a circular the following letter from John M. Goodwin, Engineer of the Sharpsville Railroad, in which he describes the performance of a mogul locomotive on his road. The general dimensions of the engine were: Cylinders, 16 × 24 in.; driving wheels, 4 ft. in diameter; total weight, loaded, about 67,000 lbs.; weight, loaded on drivers, 57,000. The letter is dated at Sharpsville, Pa., July 16, 1877:

"GENTLEMEN: The Sharpsville Railroad Company, operating a coal road connecting with and crossing the Erie & Pittsburgh Railroad, at Sharpsville, is defendant in an equity suit brought against it by the Erie & Pittsburgh Railroad Company and the Pennsylvania Company, in which suit several 'experts' have been called by the plaintiffs to testify as to the capacity of locomotives generally, and particularly as to the capacity of certain locomotives on certain gradients.

"These experts base their statements on the 'tables' and the 'books,' while I, in opposition to them, set up the actual performance of one of our engines, a Baldwin 'Mogul,' the 'Oakland' (of your class 27½ D), having 16 in. × 24 in. cylinders and 4 ft. drivers, on the actual ascertained capacity of which I base our statements as to the loads that we can haul on our line.

"The traffic of our road consists in bringing coal *down grade* from our mines (of which we have eleven, supplying a business of from 800 to 1,500 tons *per diem*), and hauling our empties *up grade* to the mines.

"We have a gradient, rising toward the mines, of 83 feet per mile with a 2° curve in it. This both parties to the suit agree to account equivalent to a gradient of 87 feet per mile on a straight line.

"On this gradient, equal to 87 feet per mile, the 'Oakland,' on July 3, 1877, started from a stand-still forty five (45) empty eight-wheeled cars, weighing 669,500 pounds, or 334.75 net tons, and, without slipping her drivers, took the train up and beyond the gradient, something more than half a mile, gaining speed and steam as she went. She had 130 pounds of steam at the start; we had to open furnace-door to prevent undue increase of pressure.

"On July 12, the same engine, standing *below* the train and *pushing* up the hill, and getting no advantage from the starting of one car after another, as she might have done had she been hauling the train, started from a stand-still, on same gradient, eighteen (18) *loaded* eight-wheeled cars, weighing 329.36 net tons, and, without slipping her drivers, took them up and over the gradient, gaining speed and steam as she went. Steam, 130 pounds at start.

"On the 29th of May, 1877, same engine, *pushing*, started twenty-eight (28) *loaded* eight-wheeled cars, weighing 512.28 net tons, on a piece of track where the engine and tender and twenty-three (23) cars were on a gradient of 40.5 feet, and five cars on a gradient of 54 feet per mile, and, without slipping her drivers, took them up over a gradient of 44½ feet per mile for half a mile or more, gaining speed as she went. She made steam much more rapidly than she could use it, but by watching the steam-gauge, and varying the weight on the escape-valve according to the indications of the gauge, a uniform pressure of 125 pounds was maintained throughout this trial.

"Now you guarantee in your catalogue that an engine of the Oakland's class will haul on an eighty (80) feet gradient 515,200 pounds or 257.6 net tons, exclusive of engine and tender, and say that under favorable circumstances she will "largely exceed" this performance. The performance that I have detailed here exceeds the guaranteed performance by about twenty-seven (27) per cent.

"Do you see in the statement that I have made concerning the performance of our "Mogul" anything that appears to you incredible, or that conflicts with your experience in the matter of performance of other engines of your make?

"The 'Oakland' does work equivalent to the performance here recorded every working day in the year."

OLD AND NEW ROADS.

Atlantic & Great Western.—The employés of the Mahoning Division, with their families, some 800 in number, were treated on July 20 to an excursion from Cleveland to Shady Side, a well-known pleasure resort near Youngstown. The excursion passed off very pleasantly and resolutions of thanks to Receiver Devereux and the officers of the road were passed. All the employés of this road go on these excursions every year, those from the Main Line generally going to Chautauqua Lake.

Baltimore & Cumberland Valley.—Contracts have been let for the building of the first section of nine miles of this road, from the junction with the Western Maryland near Smithsburg, Md., northward to Quincy, Pa. The contractors are Dacy Brothers, of Boston. The road is to be 21 miles long in all, extending to Chambersburg, Pa., and is built in the interest of the Western Maryland Company, which will work it as a branch.

Baltimore & Delta.—The stockholders of the three companies have finally ratified the agreements of consolidation between the Baltimore & Delta, the Baltimore, Towsontown, Dulaney's Valley & Delta and the Baltimore, Hampden & Towsontown companies. The consolidated company, the Baltimore & Delta, has been completely organized; it purposes building a narrow-gauge road 45 miles long, from Baltimore to Delta, Pa. The road has been finally surveyed and located and its estimated cost is about $560,000. Some four miles of grading near Baltimore has been finished by the Baltimore, Hampden & Towsontown.

Central Branch, Union Pacific.—The contract for grading the branch to Scandia, Kan., has been let to John Beeson, of Atchison, who has already a large force at work.

Central Pacific.—It is stated that this company is about to extend its Northern Railroad from its present terminum at Williams, Cal., northward 23 miles toward Colusa. The west side of the Sacramento valley, which this line serves, has a great wheat crop this year, and it is said that the new extension will be finished in time to carry some of it.

Track has been laid on the section of 15 miles, built also as part of the Northern Railroad, from the California Pacific at Fairfield southward to the Straits of Carquinez at Benicia. This section will be connected by ferry with that part of the Northern road already built, which runs from Martinez, on the south side of the straits, to Oakland, and which, with the San Pablo & Tulare road, will form the Central Pacific's loop line from Bantas to Oakland. The 15 miles section just finished, connects the California Pacific and the upper end of the Northern with the loop line and gives them a rail connection with Oakland, broken only by the Straits of Carquinez, across which trains can readily be ferried.

Work is also reported in progress on the unfinished section of the San Pablo & Tulare road, between Antioch and Martinez. The work there has been stopped for a long time by a tedious law-suit over the right of way. These roads, though built under separate charters, are owned by the Central Pacific.

Chesapeake & Ohio.—The following announcement is made by the new company:

"By virtue of a decree of the Circuit Court of the city of Richmond, entered on the 9th day of July, 1878, in the suit of Duncan and Calhoun, trustees, against the Chesapeake & Ohio Railroad Company and others, the Chesapeake & Ohio Railway Company will pay at its office in Richmond, Virginia, on and after the 22d day of July, 1878, and thenceforth from time to time, to and including the 30th day of September, 1878, as the same may be properly demanded of them, the following interest due upon bonds of the Virginia Central Railroad Company:

"All the interest past due including the installment which fell due 1st July, 1878, upon $100,000 bonds secured by the first mortgage of the said railroad company (of the Board of Public Works of Virginia).

"II. All the interest past due, including the installment which fell due 1st July, 1878, upon $16,000 of registered bonds secured by the mortgage of said railroad company to Lyons, Fry and Macfarland, trustees, dated 2d June, 1854.

"III. All of the interest coupons past due upon the residue of the bonds ($902,000), secured by said last-named mortgage to and including the coupons which fell due 1st January, 1878, with interest on said coupons from the time of their maturity respectively to 1st July, 1878.

"The Chesapeake & Ohio Railway Company will also issue, on application, on and after the said 22d July, 1878, at its office in Richmond, Va., to the parties entitled to receive the same, its obligations, dated July 1, 1878, and payable in one, two or three years after date respectively, with interest at the rate of 6 per cent. per annum, payable semi-annually on the first days of January and July in settlement of the balance of interest past due on bonds and other indebtedness of the Virginia Central Railroad Company up to and including that which fell due July 1, 1878, not included in the cash distribution provided for as above, and in respect of which, by the terms of sale of the property of the late Chesapeake & Ohio Railroad Company, the purchasers were allowed a credit of one, two, and three years in equal annual installments, and were required to issue such obligations therefor.

"The payment of the above-described obligations is secured by the lien of the trust deed executed by the Chesapeake & Ohio Railway Company by order of the Court to Joseph Bryan and H. T. Wickham, trustees, for the purpose of securing the payment of that part of the purchase-money for which credit was given, as provided in the several judgments and decrees under which the said property was sold.

"Parties presenting their coupons or claims for interest for participation in the cash distribution are requested to present at the same time all additional coupons or claims for interest held by them, and receive the obligations to which they are entitled in settlement of that part of the interest due them not embraced in the cash payment; and all other holders of bonds of the Virginia Central Railroad Company are requested to make early presentation of their interest claims for adjustment."

Cincinnati Southern.—A number of bids have been received for completing this road, but most of them gave only the prices per yard for grading and similar bids for other work. Six bids in a lump sum were received, R. G. Huston & Co. offering to complete the road for $1,690,630 with all the bridges and trestles of iron, or for $1,671,998 with 12 wooden and 34 iron bridges, or for $1,560,902 with eight iron and 38 wooden bridges. The bids of James M. Clark & Co., under the same conditions, were $2,011,442, $1,985,445, and $1,840,597.

A bid made by the Common Carrier Company was set aside on account of informality, and because it included a proposal for the lease of the road.

Denver & Rio Grande.—The Denver (Col.) *News*, of July 12, says: "Yesterday morning the first decision of the Judges of the United States Circuit Court, in the railroad controversy pending between the Denver & Rio Grande Railroad Company and the Atchison, Topeka & Santa Fe road, was delivered by Judge Moses Hallett. The complainant (Denver & Rio Grande) has since amended the bill filed at the time of the injunction, making new allegations which strengthen its case. This was demurred to, and the bill as amended is admitted by the demurrer and filed by the defendants to be true. The allegations now made in the bill make a case that must be met by the defendants by an answer and proofs. The Court, therefore, overrules the demurrer, and allows defendants to answer and put the parties upon proofs in the case. The demurrer having been overruled, the defendants (Atchison, Topeka & Santa Fe) will have to file their answer and proceed to take testimony preparatory to having the case come up for final hearing, and for such decree as the Court deems equitable and just. Meantime, no order has been made affecting the injunctions heretofore granted in the several cases, and the suit remains as at first instituted."

Eastern, in New Hampshire.—At the stockholders' meeting in Portsmouth, July 18, it was stated that the suit in the State Court against the Eastern, of Massachusetts, lessee, had been set for argument Aug. 15, and would then be finally submitted. In the suit against the lessee in the United States Circuit Court there was no change.

The stockholders voted to accept certain amendments to the charter recently passed by the Legislature, the most important of which authorizes the modification or extension of the present lease of the road or the making of a new contract, such new contract or modification to be approved by the stockholders.

Elberton Air Line.—Work is progressing well on this road. The ties are being delivered all along the line, though some delay has been caused by the failure of the rolling mill to supply the rails as fast as they can be used. The track is laid from the junction with the Atlanta & Charlotte Air Line at Toccoa City, Ga., east by south six miles, and a construction train is at work.

Grand Trunk.—A London dispatch of July 21 says: "The *Observer*, in its financial article, says: 'Mr. Hickson, of the Grand Trunk Railway, and Mr. Garrett, of the Baltimore & Ohio Railroad, are negotiating here to give the Grand Trunk a Chicago connection over Mr. Garrett's line in order to counteract Vanderbilt's recent acquisition.'"

Great Western and Canada Southern.—A number of officers of these companies and the New York Central, met in Saratoga, N. Y., July 21. Col. Thomas A. Scott was also present, having come by invitation to act as arbitrator on the question of a division of through business between the Great Western and the Canada Southern. After both roads had presented their cases, the meeting adjourned; the arbitrator promising a decision in a few days.

Subsequently Mr. Scott gave his decision, awarding the Great Western 60 per cent. and the Canada Southern 40 per cent. of the through passenger business; the Great Western 55 per cent. and the Canada Southern 45 per cent. of the through freight. This award applies to all competitive through business carried by both roads through Canada that may pass through the city of Detroit or other points of connections east and north of Toledo, but excluding the business of Toledo and Southwestern points. The award designates how settlements are to be made and recommends Albert Fink, Trunk Line Commissioner, as the party to keep accounts and direct settlements. The agreement is to be binding for six months, and either party is to give three months' notice of a change.

Gulf, Colorado & Santa Fe.—The Galveston (Tex.) *News* says: "The public have been informed at length of the salient points of the proposed contract for placing the bonds of the Gulf, Colorado & Santa Fe Railroad Company. The main features of the projected arrangement are briefly as follows: The amount of bonds to be placed is $2,700,000. The proceeds of the sale shall net the company not less than 70 per cent. of this amount. The bondholders, as such, shall have one vote for each $100 of their bonds on all questions determinable by stockholders, but without participating in profits. Most of the directors shall be resident Galvestonians, and at the expiration of ten years the option shall remain with the bondholders of capitalizing their bonds by converting them into stock. Probably there is nothing in the act of incorporation forbidding these provisions. The question, then, for those who are to deliberate upon and ratify or reject the contract is simply one of expediency. Passing by what may appear to be the rigor of these conditions, the first thing that strikes one is that felicitations as to something accomplished are premature. If the contract is ratified, it amounts to only an agreement on the part of the company to sell its bonds at a minimum price, and upon fixed conditions, and on the part of the brokers to use their endeavors to dispose of the bonds upon these conditions, and within a stated time, for the best price possible, and not less than the minimum price. There is no obligation to take the bonds. There is no assurance on the face of the agreement that they will be taken or disposed of. On the part of the brokers it is simply an engagement to use their best efforts in this direction."

Hudson River Tunnel.—It is said that work is soon to be resumed on this tunnel, which is to connect New York and Jersey City. A shaft was begun some time ago on the Jersey City side, but the work was stopped by legal proceedings, which are now at an end. The projector, D. W. C. Haskins, claims to have secured a large amount of capital from friends in California, and says that the work is to be carried on without further delay. There are two companies organized to build it, one in New Jersey and one in New York, the incorporators of both being the same. The united amount of their capital stock is fixed at $10,000,000.

International & Great Northern.—A plan of reorganization has been prepared by a committee and submitted to the bondholders for their approval. The liabilities of the company are stated as follows:

Preferred debts, judgments, Receiver's debts, etc.		$800,000
First-mortgage bonds	$7,348,000	
Coupons unpaid, funded and unfunded	2,038,839	
		9,386,839
Second-mortgage bonds	$4,959,000	
Coupons unpaid	1,884,420	
		6,843,420
Stock		5,500,000
Total		$22,530,259

It is proposed to cancel the present mortgages, or if necessary to foreclose them. In either event the securities to be issued by the new company or by the old company reorganized, are to be $7,210,800 stock, $5,192,500 first-mortgage 7 per cent. bonds, and $9,000,000 second-mortgage income 7 per cent. bonds. These securities are to be distributed as follows: The holders of the present first-mortgage bonds to receive 50 per cent. of their claim in new first-mortgage and 50 per cent. in income bonds; $900,000 new first-mortgage bonds to be reserved to provide for the prior liens. The second-mortgage bondholders are to receive 50 per cent. of their claims in income bonds and 50 per cent. in stock; present stockholders to receive new stock. It is believed that the road can certainly earn interest on the new first-mortgage bonds, and interest on the income bonds will be payable only as earned.

Bondholders approving the plan are asked to deposit their bonds with the Farmers' Loan & Trust Company in New York; also to sign an agreement constituting Moses Taylor, Wm. Walter Phelps, John S. Kennedy, Samuel Thorne and John Sealy a committee with full authority to carry out the agreement and reorgarize the company under its terms. It is said that several large bondholders have approved this plan.

Lexington & Nashville.—This company has filed articles of incorporation in Tennessee to build a railroad from Huntingdon, on the Nashville, Chattanooga & St. Louis, south to Lexington and thence south by west to the Mobile & Ohio at Henderson, the distance being about 45 miles. E. F. Falconnet, G. H. Nixon, L. S. Goodrich, A. H. Rhodes and John M. Taylor are the incorporators.

Manhattan & Northwestern.—This road was graded several years ago from Manhattan, Kan., northward up the Big Blue River some 40 miles, and seven miles of track had been laid when the company failed and work was suspended. Local papers now report that negotiations are in progress with the Burlington & Missouri River in Nebraska to take the road and finish it up the Big Blue to a connection with its Omaha & Southwestern Branch at Beatrice, Neb. It is thought that the agreement will be made, provided sufficient local aid can be raised, and that the road will also be extended from Manhattan south to the Osage coal fields.

Michigan Central.—The Detroit *Post and Tribune* says: "All the trains of the Lake Shore & Michigan Southern will arrive at and depart from the Michigan Central depot after the 1st of August.

"The arrangements for the consolidation of ticket offices were perfected yesterday. They go into effect on the 1st of August. The up-town offices of the Michigan Central, Canada Southern & Lake Shore will then be consolidated into one, with Mr. Warren in charge and Mr. Rhines as his lieutenant. The present Canada Southern office will be occupied until the new Board of Trade building is completed, when the corner office on the first floor of that building will be occupied. The consolidated office at the depot will be in charge of Messrs. Chamberlain and Schumm. The gentlemen whom this arrangement leaves without a situation are Messrs. Skinner, of the Central; Brent, of the Lake Shore, and Baker and Marshall, of the Canada Southern."

Montclair & Greenwood Lake.—In order to protect their interests at the foreclosure sale, pending the settlement of the difficulties with the second-mortgage bondholders, the committee representing the first-mortgage bondholders asks for authority to buy in the road. Bondholders are therefore requested to deposit their bonds with M. K. Jesup, Paton & Co., in New York, and to pay an assessment of 5 per cent. for the purpose of furnishing the money to pay the Receiver's debts and costs of foreclosure, which must be paid in cash. If all the bonds are deposited no further assessment will be required. It is hoped that an equitable arrangement with the second-mortgage bondholders will be made.

New Brunswick.—The track on this road is now laid to Hammond Place, N. B., which is on the St. John's River, nearly opposite Van Buren, Me., and 12 miles north of the old terminus at Grand Falls. Work is in progress on the extension to Edmundston, 26 miles further up the river.

New Orleans Pacific.—The Louisiana Supreme Court has affirmed the decision of the lower court in the matter of the application of this company for a *mandamus* to compel the issue of the State bonds voted in aid of the road. The effect of this decision is that the bonds to be issued by the company in exchange for the State bonds, must be made in the form and manner required by the Governor.

Pennsylvania.—This company's statement for June shows, as compared with June, 1877, for all lines east of Pittsburgh and Erie:

A decrease in gross earnings of	$65,976
A decrease in expenses of	136,961
Increase in net earnings	$70,985

For the six months ending June 30, as compared with the same time in 1877, there was on the same lines:

An increase in gross earnings of	$115,541
A decrease in expenses of	500,937
Increase in net earnings	$616,478

All lines west of Pittsburgh show for the six months a deficiency in meeting all liabilities of $603,897, being a gain of $110,928 over the same period in 1877.

Philadelphia & Atlantic City.—The Atlantic City (N. J.) *Review* says of this road: "A large number of the company's due bills for labor are afloat, and the failure will entail much trouble to a class who can ill afford to sustain such a misfortune.

"The following facts relative to the stock of the company may be interesting: Mr. Massey held shares to the amount of more than $130,000, all of which were paid up; Mr. James M. Hall to the amount of $10,000; Mr. C. R. Colwell, $130,000, paid up; Mr. W. Dwight Bell, $17,500; Mr. Samuel Richards, $20,000, donated by the board of directors in consideration of his resigning the presidency in favor of Mr. Massey. Mr. Massey has $225,000 in mortgage bonds, for money advanced the company, also a chattel mortgage covering $60,000 represented by cars that he had leased to the company and paid for, making $415,000 in cash in the company. Mr. Massey has also indorsed to the extent of $260,000 for the company, the notes to fall due in three equal payments in one, two and three years, the first maturing on Sept. 10 next. It is reported that the laborers' certificates amount to between $40,000 and $60,000."

Pittsburgh, Cincinnati & St. Louis.—This company reports as follows for the six months ending June 30:

Gross earnings	$1,511,438
Expenses (65.64 per cent.)	991,857
Net earnings	$519,581
Interest on bonds, six months	334,895
Surplus	$184,686

Gross earnings include interest received on equipment; expenses include interest on car-trust cars and rental of Monongahela Extension in Pittsburgh.

Pittsburgh Southern.—As noted at the time, this company some time ago decided to give up its connection with the Pittsburgh & Castle Shannon and to make another entrance into Pittsburgh. This has been done by building four miles of new road from Castle Shannon eastward to Banksville, and by laying a third rail on the Little Saw Mill Run Railroad from that point north three miles to its terminus at Temperanceville, a suburb just across the river from Pittsburgh, and not far from the Point Bridge. The road is now finished and regular trains began to run to the new terminus July 22. Work is also progressing well on the branch of 12 miles to Washington, Pa.

Railroad Mail Service.—A dispatch from Washington, July 24, says: "At the last session of Congress a reduction of 5 per cent. was made on rates hitherto paid railroad companies for transporting the mails. In reply to the notification of this reduction given by the Postmaster-General to all railroad companies engaged in carrying the mails, President Hinckley, of the Philadelphia, Wilmington & Baltimore road, has given notice, intimatting that his company will not carry the mails at the reduced rates. In a letter received to-day at the Post Office Department, President Hinckley says: 'I lose no time in notifying you that these rates are not remunerative or satisfactory to this company, and that they cannot be accepted by me until our board has taken action in respect to them. To guard against inconvenience to the public, I would respectfully suggest to you that it would be well to expect a discontinuance of mail service upon the part of this company ere long, unless our work be lessened in the same ratio as the pay is lessened.'"

Richmond, Fredericksburg & Potomac.—In view of the protest made by some of the stockholders, and the action of the Virginia Board of Public Works, the directors of this company have decided not to complete the proposed contract with the Potomac Steamboat Company, but to lay the matter again before the stockholders. The board has therefore called a special meeting to be held Sept. 30, for this purpose.

Rome & Clinton.—The Utica (N. Y.) *Herald* says: "A. W. Mills, the Secretary and Treasurer, says that the land debt has been paid. Henceforth its earnings will be divided among the stockholders. The Delaware & Hudson Canal Company have a perpetual lease of the road, under which they guarantee to operate it, keep it in repair, pay all taxes on it, and pay over to its directors as yearly rent the net sum of $25,000. This sum, divided among the stockholders, would make an annual dividend of from 8 to 9 per cent., but as there will be some expense attending the management of the affairs of the company, of course that entire sum cannot be divided. It is certain that at least 7 per cent. per annum will be regularly divided among the stockholders hereafter."

St. Louis & Southeastern.—Auditor Young's report for the month of June is as follows:

	St. Louis Div.	Ky. Div.	Tenn. Div.	Entire Line.
Gross earnings	$48,104.50	$26,975.36	$13,283.51	$88,363.37
Expenses	37,545.17	24,627.06	10,718.96	72,891.19
Net earnings	$10,559.33	$2,348.30	$2,564.55	$15,472.18
Per cent. of exps.	78.22	91.21	82.45	82.83

As compared with June, 1877, the entire line shows an increase of $9,120.60, or 11.5 per cent., in gross, and of $4,966.00, or 47.3 per cent., in net earnings.

Spartanburg & Asheville.—Work is progressing steadily on the extension of this road to Hendersonville, N. C. Iron for 10 or 12 miles is on hand, and the high bridge over Green River is ready to put up. The long cut just beyond the present terminus at Pace's Gap, which has caused some delay, was finished last week.

Springfield, Jackson & Pomeroy.—The last rail on this road was laid with much ceremony July 18 at a point four miles east of Bainbridge, O., and near the bridge over Paint Creek, the erection of which had delayed the tracklayers a little. Excursion trains from both ends of the road met at this point, and the last spike was driven by Hon. James Emmitt, formerly President of the Company, who turned the first sod on the road three years ago. The ceremony was completed by a lunch at Bainbridge. The first train then ran through from Jackson to Springfield, carrying two car-loads of Jackson County coal and some other freight.

The road, which is of 3 ft. gauge, extends from Springfield, O., east by south through South Charleston, Washington and Greenfield to Jackson, 108 miles. Of this 103 miles have been built and are owned by the company, and the use of five miles, from Washington Court House westward, is leased from the Dayton & Southeastern Company. Forty-eight miles of the track, from Washington Court House to Waverly, have been laid this year. Part of the new track is already ballasted and the contractor is pushing this work as fast as possible. The road is well equipped for its present business, and for the expected traffic in coal from its eastern terminus.

Texas Western.—The Farmers' Loan and Trust Company, Trustee, made application for the appointment of a receiver for this road, interest having been in default for some time. The application was granted. The road is of 3 ft. gauge, and is 41 miles long, from Houston, Tex., west to Pattison. The company has been in trouble financially ever since the road was built.

Toledo, Peoria & Warsaw.—Receiver Hopkins' report for May and June is as follows:

Balance May 1		$68,544
Receipts for May		150,857
" " June		122,714
Total		$342,115
Disbursements for May	$109,549	
" " June	209,152	
		318,701
Balance July 1		$23,414

In May the receipts were greatest by $41,308; in June the disbursement exceeded the receipts by $86,438, making the disbursements $45,130 more than the receipts for the two months.

Toronto, Grey & Bruce.—This company is reported as having failed to pay the July coupons on its $2,000,000 first-mortgage bonds, which are chiefly held in England. It has been embarrassed financially for some time. The company owns a line of 3 ft. 6 in. gauge from Toronto, Ont., to Owen Sound—122 miles—with a branch from Orangeville to Testwater, 60 miles. The bonds represent about one-half the cost of the road, one-fourth having been raised by stock-subscriptions and one-fourth by Provincial and municipal donations.

Wabash.—In the United States Circuit Court at Indianapolis, July 17, an amended bill of complaint in the Tysen suit was filed. It rehearses the history of the case in the usual manner, and further alleges neglect on the part of the trustees under the prior mortgages in not enforcing the remedies provided by the several trust deeds. It asks that these trustees be made defendants in the suit and be required to answer the bill. It also asks that an accounting be had of the amount due under the several mortgages, and that a decree of foreclosure and sale be granted in default of payment. Finally it asks that the equipment bonds be declared to be secured under the consolidated mortgage, and that a receiver be appointed pending the suit.

West End.—This road is so far completed that the rails are laid and trains are run over a part of it. It is about 1½ miles long, from the New Jersey Southern depot in Long Branch, N. J., running through the town to a point near the hotels at the southern end of the place. It is built and will be worked as a branch of the Southern, and is intended to reach the hotels which have hitherto been at some distance from the depot, and whose guests have been therefore apt to travel by the New Jersey Central, which runs through the whole length of the place.

Wilmington, Columbia & Augusta.—A meeting of bondholders was held in Baltimore, July 17, at which the committee previously appointed made a report. It states that to put the road in good order there will be needed $113,600 for rails and $25,200 for trestle-work. The bondholders, after some discussion, appointed a committee to assist the trustees in securing a decree of foreclosure and sale against the road.

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Raleigh & Gaston.

This company owns a line from Raleigh, N. C., northeast to Weldon, 97 miles. It is equipped with 13 engines, 13 passenger and 9 baggage cars, 131 freight and 10 gravel cars. The following statements are from the reports for the year ending May 31, as presented at the recent annual meeting:

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P.c.
Gross earnings	$242,478.41	$234,510.73	I.. $7,967.68	3.4
Expenses	135,292.91	148,761.01	D. 13,468.10	9.1
Net earnings	$107,185.50	$85,749.72	I..$21,435.78	25.0
Gross earn. per mile.	2,499.78	2,417.04	I.. 82.14	3.4
Net " "	1,105.01	884.02	I.. 220.99	25.0
Per cent. of exps.	55.79	63.43	D. 7.64	12.0

The President's report states that the condition of the road and equipment is good. From a financial point of view the exhibit of the business for the past year is gratifying, considering that it has been a period of great depression. He stated that during the present year two new engines must be purchased, while additions to the car equipment must be made. The purchase of 500 tons of steel rail is also necessary.

The report of the Superintendent, Major John C. Winder, states that during the year there were laid 225 tons of new rail, all with the fish-bar joint. He recommends the purchase of 500 tons of steel rail, and that in future this rail be used exclusively. The road-bed is good, but the necessity for ballast is felt. The bridges are in perfect order. The station warehouses have all been newly painted. The locomotives are entirely serviceable. Several have been entirely overhauled, while a number of cars of all classes have been constructed. There have been no accidents, save the injury to a ride-stealing tramp, who lost a leg. The completion of the Raleigh & Augusta Air Line (substantially owned by this company) to Hamlet and a connection with the Carolina Central, has proved of much advantage to the business of the road.

The Inspection Committee reported the road in satisfactory condition, and recommended the use of steel rails for all renewals hereafter.

The stockholders voted to change the time of the annual meeting to the first Wednesday in October each year.

Manchester & Lawrence.

This company owns a line from Manchester, N. H., to the Massachusetts line, 22.25 miles, and it leases from the Boston & Maine the Methuen Branch, from the State line to Lawrence, Mass., 3.75 miles, making 26 miles worked. It is worked under a parole agreement with the Concord Company, that company furnishing equipment. The report is for the year ending March 31.

The general account at the close of the year was as follows:

Stock ($44,944 per mile)		$1,000,000
Notes and bills		34,427
Income and expense account		89,621
Total ($50,519 per mile)		$1,124,048
Road, equipment, etc. ($46,747 per mile)	$1,040,124	
Concord Railroad	32,000	
Cash	51,924	
Mt. Washington, Suncook Valley and North Weare roads		
		1,124,048

The directors remark of this statement: "As our financial interests in the last three items are not yet definitely determined, we prefer to represent them by ciphers, as they stood in our last report, not wishing our stockholders to lose sight of them, because from them originate many of the points which have so long been in controversy between ourselves and the Concord Railroad directors. These matters have, to a large extent, been recently verbally agreed upon, but as yet have not gone so far as to change any securities in the hands of our treasurer or to authorize the directors to make any change in the statements of our liabilities and assets. This must still await the adjustment of items in each of the several accounts, about which questions have arisen that can be very easily settled by slight mutual concessions, fully justified by a desire to agree, which, we believe, governs both parties."

The passenger and freight business for the year was as follows:

	1877-78.	1876-77.	Inc. or Dec.	P.c.
Passengers carried	115,872	120,701	D. 4,829	4.0
Passenger mileage	1,907,494	1,620,602	I. 286,892	17.7
Tons freight carried	48,516	66,144	D. 17,628	26.7
Tonnage mileage	777,239	1,191,219	D. 413,980	34.8

The decrease in freight was chiefly in through business from the upper roads. The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passengers	$56,116	$60,537	D..$4,421	7.3
Freight	34,418	37,823	D.. 3,405	9.0
Express, mail, etc.	10,388	11,582	D.. 1,194	10.1
Concord R. R. on joint account	70,855	67,760	I... 3,095	4.6
Total	$171,777	$177,702	D..$5,925	3.3
Expenses	71,319	77,266	D.. 5,947	7.7
Net earnings	$100,458	$100,436	I.. $22	...
Gross earnings per mile	6,607	6,835	D.. 228	3.3
Net " "	3,864	3,863	I.. 1	...
Per cent. of expenses	41.52	43.48	D.. 1.96	4.5

From the net earnings the usual semi-annual dividends of 5 per cent. were paid, $100,000 in all, leaving a balance of $458 to be carried to income account.